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W. C. MONROE—President and Editor
LARRY O. MILLER, Advertising Manager
FRED JONES, Chicago Manager
228 No. La Salle St., Chicago 1, Ill.

KINZIE MILLER—Vice President
HOWARD F. McCLENAHAN—Cleveland Manager
Room 402—1010 Euclid Bldg., Cleveland 15, Ohio
The McKeown Company—New York Representatives
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December 15th, 1952

Elk Hills Gas Plant

Parsons-Macco Company recently completed construction of a brand-new gas plant at Elk Hills' Naval Petroleum Reserve No. 1, winding up a construction job that began December 1, 1951.

Standard Oil Company of California and the United States Navy, participants in the unit operation plan at Elk Hills, together will pay more than $6,000,000 for the new plant and its facilities. Final cost accounting is not yet complete. Cost will be shared between Standard and the Navy on a formula to be based on plant design.

Rated capacity of the new plant is 50,000,000 cubic feet of gas per day. If the plant were operated at full capacity, it could turn out something like 45,000 gallons of gasoline, 48,000 gallons of propane, 26,000 gallons of butane, 15,000 gallons of isobutane and considerable dry gas each day.

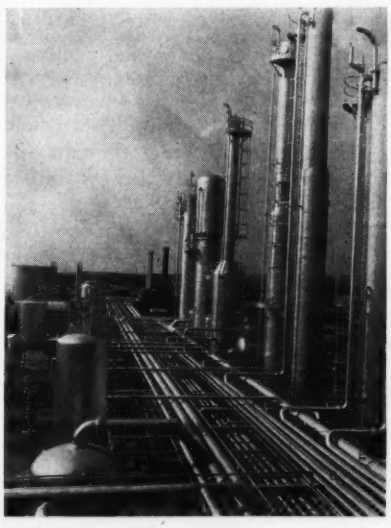
Full operation of the new plant, technically known as a gas process and pressure maintenance plant, is dependent on the opening up of Elks Hills' shut-in wells. On numerous occasions the Navy has indicated that these wells will only be opened up in the event that private producers are unable to supply demands of the armed forces.

If the quantity of gas production from the reserve becomes great enough, the new plant may be operated at limited capacity. Until then, gas resulting from production under the Navy's readiness program and the testing of new wells will be processed at the reserve's existing gas plant.

Set up to handle 3,000,000 cubic feet of gas per day, the existing plant currently is processing about 1,750,000 cubic feet of gas per day. It produces about 1000 gallons of gasoline per day. Present facilities are inadequate for production of other fuels. If the new plant should go into full operation, the existing plant would be used as a booster station.

With full operation of the new plant something of a vague possibility, the entire plant, with the exception of the lighting system and fire-fighting equipment, has been mothballed.

Items of equipment subject to damage by moisture, including such things as electric motors, precision recording and controlling instruments and electrical switch gears, have been stored inside heated buildings to prevent deterioration or corrosion.



Columns at the new gas plant at Elk Hills.

All plant parts subject to corrosion have been coated with preservative oils—cosmoline or lubricating oil with high detergency. When it was believed to be necessary, equipment actually was disassembled, treated and stored.

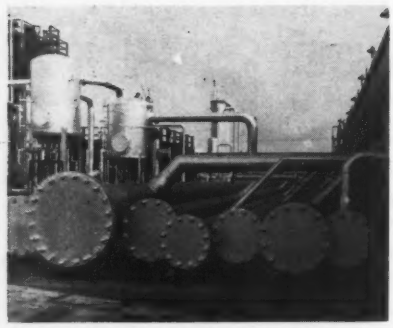
Pump motors were removed and stored. Electric lines serving the pumps were disconnected. Preserving oil was put in the pump cases and preserving grease applied to external surfaces. Desiccants were put in the indicator cases for many of the instruments.

Even the cooling tower was mothballed. Cooling sections in the tower were sprayed with preserving oil, after which baffles were placed over the top of the coils to prevent water from dropping on them. If and when it is necessary to return the coils to operation, they will be sprayed with solvent—a quick, easy method of undoing the mothballing job.

One man will be kept on duty at all times in the mothballed plant. His duties will include not only those of a watchman but also miscellaneous maintenance work.

Plant equipment includes seven columns: an absorber rich oil rectifier, stripper, de-ethanizer, depropanizer, de-butanizer, and deisobutanizer. With the exception of the absorber, all columns were designed for double the plant's present capacity.

Other major items of equipment are seven 880-horsepower Clark



Lines dead-ended to facilitate expansion of plant to double present capacity with a minimum of shut-down time.

compressors, one 330-horsepower Clark compressor, two 20,000 pounds-per-hour boilers from United Iron Works, one 19,000 000 BTU-per-hour rich oil furnace, twenty pumps, and some forty feed drums and reflux drums for the columns. Hudson fin-tubed air exchangers will handle a large portion of the cooling work.

Storage facilities include two 25,-000-gallon gasoline tanks, three 25,-000-gallon butane tanks, two 25,000-gallon iso-butane tanks, and two 25,000-gallon propane tanks.

Engineers, Ltd. Pipeline Company laid approximately 100 miles of pipelines to serve as an injection and gathering network for the new plant.

Lines laid over the up-and-down surface of the Elk Hills' reserve included approximately 99.100 feet of two and three-eighths inch pipe; 125,000 feet of three and one-half inch pipe; 109,000 feet of four and one-half inch pipe; 74,000 feet of six and five-eighths inch pipe; 44,000 feet of eight and five-eighths inch pipe; 60,000 feet of ten and three-quarters inch pipe; 42,000 feet of twelve and three-quarters inch pipe; and 45,000 feet of sixteen inch pipe. Wall thicknesses varied with pressure requirements.

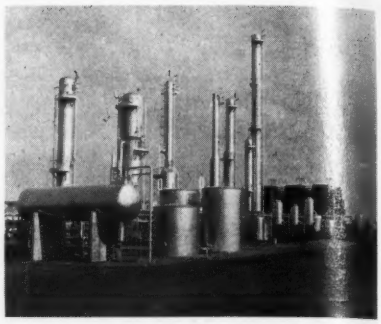
After construction of the plant was completed, running tests were made as a preliminary to mothballing the plant. No load tests were made.

Along with all but one of the columns, plant piping was designed for double the present capacity. Piping was so arranged that with a minimum of shutdown time it would be possible to add the new compressors necessary to attain the double capacity rate.

Doubling capacity of the plant would necessitate the addition of the following equipment: one more boiler, one more furnace, one more absorber, and more compressors. It would be necessary to double the size of the cooling tower by extending the base and building beside the existing tower. It would also be necessary to enlarge storage capacity.

Site of the new plant is near the intersection of the Taft-Buttonwillow Highway and Elk Hills' Skyline Road in the southwestern portion of the 46,000-acre naval petroleum reserve.

If Elk Hills' shut-in wells were opened up, the new plant would be called on to serve a field which could produce upwards to 100,000 barrels of oil per day—more than 10 per cent of California's present daily production. Proved reserves in the field are conservatively estimated in excess of 650,000,000 barrels—almost double the reserves of any other California oil field.



New gas process and pressure maintenance plant at Elk Hills Naval Petroleum Reserve No. 1.

Standard Oil Company of California supervised construction of the new gas plant. John Park, Standard engineer, acted as construction engineer, assisted by John Ziebarth, also of Standard.

Members of the two-man operating committee for Naval Petroleum Reserve No. 1 are W. A. Walker, representing the Navy, and V. O. Wankowski, representing Standard Oil Company of California. Commander W. M. Gustafson is inspector of Naval Petroleum Reserves in California, with offices at Elk Hills. Assistant inspector is Commander F. W. Gooch.

Airborne Electro-Magnetometer Aids Exploration

Wildcatters today have a new team to aid them in the uphill struggle to find new oil fields—the versatile helicopter and a newly-developed airborne electro magnetometer.

After an intensive three-year research and development program, Kern Copters, Inc., of Bakersfield recently put this new exploration aid into commercial operation.

James C. Arnold, well known Los Angeles electrical engineer, conducted the research and design program. He has been active in the development of electrical equipment for the oil industry for the past 23 years.

In operation, the new device tackles the job of finding out what the earth looks like below its surface by measuring the magnetic field —a measurement which then may be translated mathematically into a sub-surface contour map.

Development of the airborne electro-magnetometer began in earnest about three years ago. The fact that the magnetic field of the earth is much stronger near the surface made the helicopter, with its ability to maintain a constant low-level altitude and slow airspeed over most types of terrain, a "natural" to serve as a mount for the new instrument.

Ability of the helicopter to land on almost any terrain, or with floats when used over water, made it ideal for the type of reconnoissance work planned for the electro-magnetometer—work in those out-of-the-way, hard-to-reach places which are, for the most part, the frontiers of the oil exploration business.

Experimental nature of early work with the new instrument necessitated a certain amount of secrecy, so much of the initial field work was done in the early morning hours in seldom-traveled areas.

Early tests were made in the Mojave Desert, considered to be an ideal region in which to determine magnetic susceptibilities and their effects on the records. Within the space of a few miles in the desert, it is possible to find pre-Cambrian,

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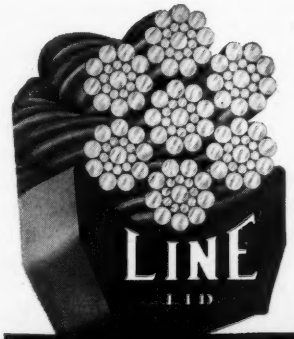

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As development progressed, the instrument was tried out in proved fields in Kern County, where results could be compared with results already obtained by seismographic surveys.

Extensive field and laboratory work led to development of the electro-magnetometer now in use. Component parts are the recorder, computing device, and magnetic detector. Together they weigh 207 pounds.

Less than half an hour is required for complete installation on a helicopter. The recorder is mounted directly in the cockpit in front of the magnetometer operator The computing device is mounted between the operator and the pilot in the helicopter. The magnetic detector, commonly known as the "bird," is rigidly attached to the longerons forward of the tail rotor and is connected to the computer by means of cables.

Measurement of the magnetic field is recorded on a strip chart with pen and ink. Use of a standard strip of paper ten inches wide for a strip chart affords an opportunity for critical measurement of variations of the earth's magnetic field.

Total magnetic field in California is 50,000 gammas, a gamma being the unit of measurement for the earth's magnetic field. Degree of detail recorded by the electro-magnetometer may be seen from the fact that it will measure 1/50,000 part.

Great detail is obtained in the records by the helicopter's ability to fly safely at altitudes from 50 to 75 feet and slowly at speeds of less than 40 miles an hour.

After the record is made, it becomes a mathematical possibility to draw maps and contours of the granitic basement, or solid portion of the earth, below the sediments in which the oil man is interested. Contours suggest the earth movements subsequent to oil occurrence and reference to indicated anticlines and synclines enable the geologist to determine inferentially the location of possible oil-bearing materials.

Developers of the electro-magnetometer are the first to disclaim any doodle-bug divining powers when it comes to locating oil. Their instrument is intended for use as a

Aerial survey with airborne electro-magnetometer and helicopter.

reconnaisance device which can narrow the search by showing those areas which are of greatest interest and those where oil production obviously could not occur. After the search is narrowed, it is advisable to employ seismic exploration for pin-pointing the drilling site.

Ability to survey, compute results and render a complete analysis on the magnetic properties of 800 to 1,000 square miles per month means not only that large areas now may be covered in a minimum of time but also that the cost will justify the consideration of large and hitherto unexplored regions.

While the airborne electro-magnetometer was developed primarily for use in finding oil, it may also be used for mineral prospecting and particularly for the location of iron-bearing formations and other minerals of high magnetic susceptibility.

Bob Didier, left and Jimmie Arnold examine 10-inch strip chart taken from recorder.

When a job is finished, the company that employed the airborne electro-magnetometer and its flying crew receives a contour map of the area surveyed. This map, with its information on the earth's hidden "hills and valleys," can be an invaluable aid in determining where to seek oil.

One of the first jobs for the helicopter and electro-magnetometer was for Tex-Harvey Oil Company of Midland, Texas. It involved surveying about 100 square miles near Brenham, Texas, and it took less than two weeks to complete the job.

A two-man team—pilot and magnetometer operator—flew over grid lines a mile apart and later, more closely, where the records showed faults. Work with the helicopter aroused much speculation in Brenham, for, in keeping with the basic silence of geophysical exploration, the pilot and operator were not permitted to disclose any more than the fact that they were doing a job for Tex-Harvey Oil Company.

Precautions with the electro-magnetometer, particularly in handling it at the Brenham airport, rivaled the secrecy with which World War II bombardiers handled the Norden bomb sight.

When the job was finished, Tex-Harvey Oil Company had a contour map with which to narrow the search for a new oil field.

The discovery well for which Harvey gave "substantial credit" to the airborne electro-magnetometer was a 9,424-foot wildcat which had been completed flowing at a potential rate of 650 barrels-per-day. Discovery of the new field six and one-half miles north of Brenham made the fourth new field discovery for Tex-Harvey, others being the Sprayberry field in Texas; the Tonti field in Illinois; and the East Long Lake field in Anderson County, Texas.

Today Kern Copters, Inc., is looking forward to new jobs in California, the Northwest and Texas, and, judging by results already obtained by the airborne electro-magnetometer, it looks as if the new device will more than prove its worth in the pressing search for new oil reserves.

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"Good Field Data Are Necessary For Good Reservoir Engineering"

by
John A. Murphy
Continental Oil Company
Ponca City, Oklahoma

Abstract

This paper defines and discusses the various factors contributing to the performance of oil reservoirs. Porosity, permeability, and interstitial water are described as reservoir rock characteristics which together with the fluid characteristics effect reservoir operation. The functions of solution gas, gas cap gas, and water in the prdouction of oil are explained. The field measurements of oil, gas, and water production are shown to be the critical factors in describing reservior performance. The conclusions of a reservior engineering study are no better than field measured data which enter into the calculations and operating expense can be considerably reduced if production data are accurately measured and reported.

Introduction

Million of dollars are being spent each year in research activities directed toward a better and more fundamental knowledge of reservoir performance. The technology of reservior engineering now embraces the fields of physics, chemistry, geology, mathematics and the not-to-be-disregarded field of philosophy and metaphysics. In fact, the basic equation relating the physical aspects of the movement of reservoir fluids is so complicated that it has yet to be adequately solved.

In spite of all this research activity and the million of dollars spent each year, the reservoir engineer has no substitute for reliable, accurate field performance data. Regardless of the precision of the formulas and their ability to predict the future behavior of a reservoir, the historical data, including oil, gas, and water production and bottom hole pressure, will always be the controlling factors in the studies of oil and gas field performance.

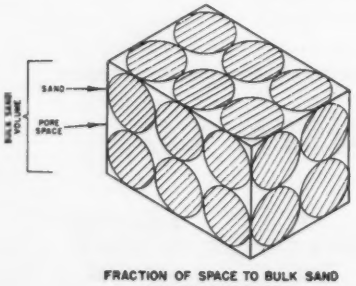
Discussion

It is not a mere presumption that the most important measured basic data relative to the performance of reservoirs are the volumes of oil, gas, and water being produced and the pressure existing in the reservoir. Of course, it is good, and even frequently quite important, to know the relative volumes and the physical and chemical relationships of the oil, gas, and water as they exist in the reservoir. However, this information is not always obtainable and frequently one has only the measurement of the volmues of the liquids as they are gauged at the surface.

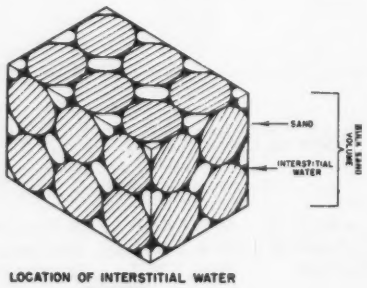
One of the most used (and also missued) therorems of reservoir engineering is the so-called "material balance equation." This states that oil, gas, and water produced from a reservoir *plus* the oil, gas, and water left in the reservoir are *equal* to the oil, gas, and water that originally existed in the reservoir. This is a very simple but a very important concept. You will note that 3 of the factors are the oil, gas, and water produced and the accuracy of these factors is the direct responsibility of the field personnel.

It is impossible to discuss adequately all of the uses for reliable field and well performance data; for the purpose of this paper, an attempt will be made to demonstrate the effect of field measurements on reservoir engineering calculations and the resultant decisions of management. First, it might be worthwhile to define several important terms used by engineers and geologists so that their tie-in to field predictions will be better understood.

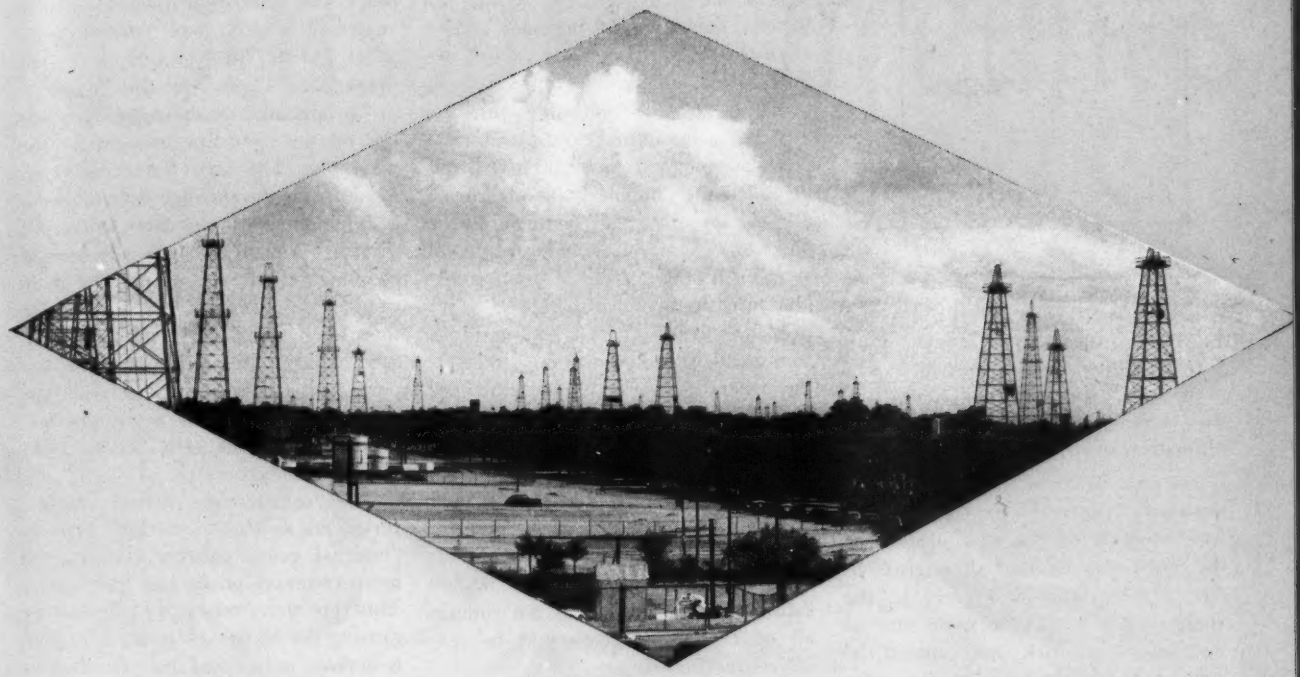
The two most important characteristics of the reservoir rocks are porosity and permeability. *Porosity* is simply the fraction of void space in the reservoir rock that is capable of containing oil, gas, or water. If one-tenth of the rock volume consists of pores or "vacant spaces" the rock has a porosity of 10 per cent. Most sand reservoirs have from 12 to 25 per cent porosity although some may be as low as 5 per cent or as high as 40 per cent. Limestone porosity usually ranges between 2 and 20 per cent. *Permeability* is defined as the ability of a porous material to transmit fluids, and is a unique property of the size and distribution of the pores. Back in 1856 a gentleman named Darcy noted that the velocity of fluids flowing through sand was proportional to the pressure across the sand and inversely proportional to the viscosity of the fluid; the standard unit of permeability measurement has since been named the Darcy. This unit is too large to describe the permeability of most reservoirs, and the term millidarcy, or one thousandth of a Darcy, is used for simplicity. If a sand has one Darcy (or 1000 millidarcys) permeability, one square foot of sand one foot thick would pass approximately one barrel of oil per day with only a pound pressure drop. Most commercial oil reservoirs have permeabilities in the range of from 50 to 500 millidarcys, although some fields produce commercial quantities of oil or gas when the permeability is less than 10 millidarcys. Permeability may be infinitely large in the case of large cracks, fractures, or channels in the reservoir rock. Sometimes zones of



FRACTION OF SPACE TO BULK SAND VOLUME IS POROSITY



LOCATION OF INTERSTITIAL WATER IN SANDS



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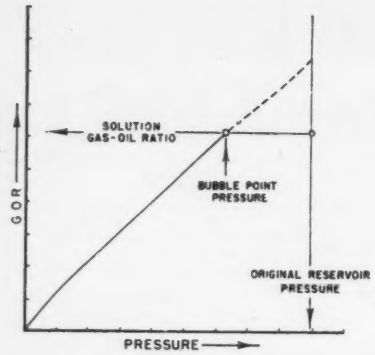


CHART SHOWING RELATIONSHIP OF SOLUTION GAS-OIL RATIO TO RESERVOIR PRESSURE

very low permeability are traversed with fractures which provide wells with very high potentials, although this is in no way indicative of high ultimate recoveries.

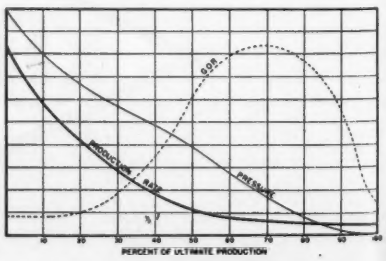
Another factor of importance is the so-called "connate" or "interstitial" water content of the rock. Either of the terms may be used although technically connate water refers to the water laid down at the same time as the reservoir rock and interstitial water is the water found in the pores of the reservoir rock when it is first drilled for oil or gas. Interstitial water is important because it decreases the amount of pore space available for oil or gas. This water seldom is produced by wells as it fills the angular spaces at the contacts of the sand grains and usually cannot be displaced under normal producing conditions. It has been found that a relationship exists between the interstitial water content and the permeability of the rock; the "tighter" or the lower the permeability of the rock, the greater the water saturation, expressed as a percentage of the pore volume. The usual range of water saturation in commercial oil or gas reservoirs is from 15 to 35 per cent. Some commercal oil sands are known to contain up to 60 per cent water, but these are exceptional; generally, if the water saturation exceeds 45 per cent of the pore space, water will be produced with the oil or gas.

Certain measurable characteristics of the reservoir fluids are important to an understanding of the behavior of oil and gas reservoirs. Perhaps the most important characteristic is the ability of the oil to contain dissolved gas. This phenomenon is similar to bottled pop containing carbon dioxide. Gas comes out of solution from the oil whenever the pressure on the oil is lowered below the so-called "bubble point pressure". For example, if 500 cubic feet of gas are in solution in the oil, the gas will come out of the oil only when the pressure is reduced below about 1500 pounds per square inch. This would be called the "bubble point pressure", and the amount of gas dissolved in the oil would be the "'solution gas-oil ratio". Frequently the original reservoir pressure is above the bubble point pressure which means that no gas comes out of solution from the oil in the reservoir until the bubble point pressure is reached. Many reservoirs have a "solution gas-oil ratio" of only 5 to 100 cubic feet per barrel of oil whereas the oil could contain 300 to 800 cubic feet of gas per barrel at the original reservoir pressure. This type reservoir would be called "undersaturated" as the oil does not contain all of the gas which could be dissolved in the oil.

The solution gas-oil ratio is a critical factor in determining the amount of oil that can be produced from a reservoir because the compressed gas may be the only source of energy available to drive the oil to the well bore. Oil expands in volume when gas is dissolved in it. Each barrel of tank oil, containing no dissolved gas, occupies something greater than one barrel of space in the reservoir where it contained dissolved gas. The number of barrels of reservoir space occupied by one barrel of tank oil is called the "formation volume factor". For example, it was metioned that at 1500 pounds pressure a certain oil could contain 500 cubic feet of dissolved gas. As a result, a barrel of stock tank oil would occupy about 1.3 barrels of space in the reservoir. As gas comes out of solution from the oil the oil "shrinks" or occupies less volume. The "shrinkage factor" is merely the percentage reduction in volume of a barrel of reservoir oil as the solution as is removed from it. Shrinkage factor and formation volume factor express the same idea, but are stated in different ways.

This discussion so far has described some of the important engineering factors which may be useful for predicting reservoir performance and ultimate recovery. There are certain other characteristics inherent to any reservoir which may control to a great extent their development and operation. These are the "driving" or "producing" mechanisms by which the oil and gas are brought to the well bore. There are 3 general classifications of producing mechanisms—solution drive, gas cap drive, and water drive. Many reservoirs will have a combination of two or more of these producing mechanisms. Actually there as a fourth type, gravity drainage; which, although it may be important, is not in the true sense a type of drive. Almost all reservoirs will produce some oil as a benefit from gravity drainage.

The "solution gas drive" also referred to as the "depletion" type or "internal gas expansion" type is the most common producing mechanism. This type drive means that the energy causing the oil to flow to the well bore is derived only from the gas which is in solution in the oil. As mentioned before, oils may hold large quanties of gas in solution at reservoir pressures and as the pressure is reduced in the reservoir, this gas comes out of solution and expands. causing oil to be driven to the well bore. When the well is opened to production, there is a pressure drop in the sand surrounding the well and the oil and gas just naturally migrate to the well, the point of lowest pressure. A solution gas drive reservoir generally produces the least per cent of the original reservoir oil of all the 3 major drives. Recoveries range in the order of 15 to 30 per cent depending on the amount of gas in solution; the permeability of the formation, and the viscosity of the oil. There is considerable debate at the present time as to whether well spacing is a major item



GENERALIZED PERFORMANCE OF SOLUTION GAS DRIVE RESERVOIRS

Season's Greetings
H C Smith
OIL TOOL COMPANY

in the per cent recovery to be obtained from solution gas drive pools.

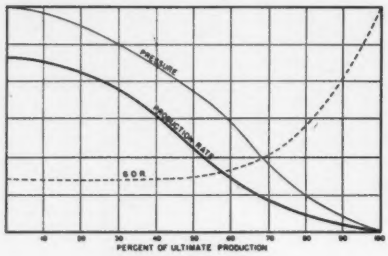
A reasonable production history for a solution gas drive pool may be shown as follows:

The production is characterized by a continous drop in reservoir pressure and production rate and an increase in gas-oil ration. The potentials of wells drop off very rapidly but gradually level off to something approaching a 10 to 20 per cent decline in production per year. The gas-oil ratios may increase to approximately 6 to 10 times the original producing gas-oil ratios. The bottom hole pressures decline rapidly and in general about 50 per cent of the reservoir pressure is dissipated when the pool has produced 30 to 40 per cent of its ultimate oil recovery.

It is very important to have accurate field data early in the life of fields of this type. Gas-oil ratios, especially on initial potential tests and shortly thereafter, are essential to the proper programming of field development and the estimation of reserves of oil and gas. Preliminary plans may be made by the management to build a gasoline plant or gas compressing facilities on the basis of early gas-oil ratio data and erroneous data can lead to misspent dollars. In solution gas drive fields it is impossible to repeat original producing conditions; from the date of first production, the wells are on the decline.

A second type drive, the "gas cap" or external gas drive reservoir exists where the oil is in direct contact with "free gas" or gas that exists in the gaseous phase in the reservoir. Gas cap drive reservoirs produce a greater pet cent of the oil than do the solution gas drive reservoirs due to the additional energy of the free gas. Recoveries may range from 25 to 75 per cent depending to a great extent on the amount of free gas present. The characteristic performance is as follows:

Well potentials decline from date of first production but not as rapidly as wells producing from the solution gas drive reservoirs. Gas-oil ratios may remain fairly low during a considerable portion of the pool's life; when they start up they continue to climb until most of the field production

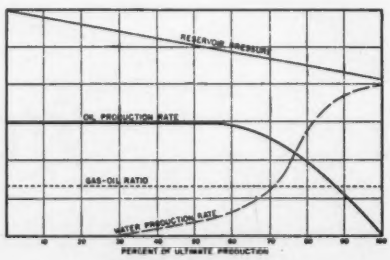


GENERALIZED PERFORMANCE OF GAS CAP DRIVE RESERVOIRS

is gas. Of course, there are all sorts of combinations of solution gas drive and gas cap drives possible as the former is usually present in a gas cap drive reservoir.

Water drive pools are generally considered to be the most productive in terms of per cent recovery of the original oil. It is not uncommon to have recoveries in the order of from 40 to 80 per cent of the original oil depending on the location of the water and the structural features of the reservoir. Water may enter a reservoir from the edge, in which case it is in contact with only a small areal portion of the reservoir fluid. As the pool is depleted, the water moves horizontally to the producing wells, flushing the oil along the bedding planes. If the permeability of the sand is somewhat constant from top to bottom and the sand is not thick, this type of drive is very efficient and a high ultimate recovery is obtained. If the sand contains some streaks of high permeability, the water may force the oil through these streaks and prematurely reach the well bore. In this case only a small portion of the sand is swept of oil and the water drive becomes inefficient. Remedial work may result in shutting off the watered-out streaks, giving the tighter sands a chance to produce.

Different from the edge water drive is the bottom water drive, wherein the oil zone is underlain by a "table" of water. If the oil saturated section



GENERALIZED PERFORMANCE OF WATER DRIVE RESERVOIRS

is thin, say from 4 to 10 feet, considerable care has to be exercised in production practice to prevent "coning" of the water into the well. Otherwise the water may move upward to the well before the oil can move horizontally to the well, thus resulting in premature "watering out" of the production. Where a thick zone of oil occurs above a water table and no barrier exists to restrict vertical movement of the water, the per cent oil recovery may be high.

The production performance of water drive reservoirs is characterized by little drop in well potential and reservoir pressure or increase in gas-oil ratio until such time as water cuts are noted. As water production increases the potentials of the wells will decrease although reservoir pressure and gas-oil ratios may remain constant. Typical performance of water drive pools will be as follows:

The foregoing discussion has been primarily concerned with reservoir factors and general performance. Obviously it is impossible to describe all the variations in average reservoir performance and it can always be assumed that no reservoir will be the typical example but some modification of several types. Before the engineer can describe the producing mechanisms of a reservoir it is necessary that he have some historical data in the form of pressure and production measurements. This is where the cooperation of the field man is required and his reliability is a direct factor in the accuracy of the engineering calculations.

The first measurement of the ability of the well to produce is the "initial potential" at which time the oil and gas rates and the surface pressures are recorded. In "depletion" or "solution gas" drive reservoirs this test can never be duplicated and represents, under the proper test conditions, the relationship of the oil and gas under original reservoir conditions. Engineers may often have to correlate laboratory data with the "initial potential" in order to establish the validity of the laboratory measurements. The gas-oil ratio for the reservoir and many predictions of gas production are based on this measurement. Ultimate oil production is a function

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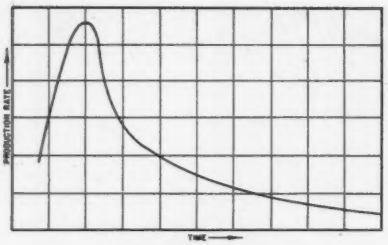


DECLINE CURVE OF SOLUTION GAS DRIVE RESERVOIRS

of the solution gas-oil ratio and thus the original estimates of recoverable oil are tied in to the "initial potential" data. The degree of permeability of the formation and the areal distribution of permeability are often determined from well potentials, and erroneous data may lead to misplaced wells, either for production or injection purposes. It is not sufficient to report accurately only the oil and gas production but also the water protion. Water produced on I. P. tests may be one of the few clues as to the water saturation in the sands or the proximity of a water table. A small and stable water cut may indicate that the water saturation in the sand is sufficient to allow a small amount to flow through the sand. Water cuts which vary with flow rates may indicate the presence of bottom water or zones of high water saturation. Not reporting water on the I. P. or not reporting it accurately can lead to misconceived ideas about the reservoir and subsequent plans for developing the reserves.

Continued accurate measurements of the oil production are required for payment of royalty and oil sales. The engineer makes good use of the oil production data as far as lease production is concerned and with various methods for graphing production data can determine to a fair degree the reserves of oil and the performance of the pool but for many purposes the lease production data are not much help. Well data or at least production data by individual sands are required. A common method for utilizing oil production is to plot monthly oil production against time or against cumulative oil. Naturally if the production is prorated the oil rate will have little meaning. However, if well potential tests are available periodically, these potentials can be plotted on similar graphs to obtain a reasonable idea of the reservoir performance. A typical "decline" curve is shown as follows:

Gas production, a seriously neglected item, is essential to an understanding of the reservoir performance. Especially is this true early in the life of all reservoirs and continuing throughout the life of solution gas or gas cap drive reservoirs. Naturally it is difficult to show a payout on the time and expense necessary to measure gas if no gas is sold and such expenditures must be made solely to provide the proper data for evaluation of reservoir performance. In "solution gas" reservoirs the gas-oil ratio is a function of the state of depletion of the reservoir and a better prediction of reserves can be made if the gas-oil ratio history is known. In all material balance calculations the total volume of production must be known and the gas is a critical item in the volume of production.

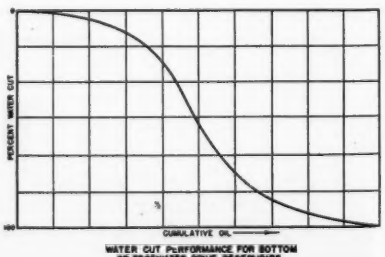
Perhaps the gas reserve indicated from the reported gas data is sufficient to support a gasoline plant or indicate that a gas injection program is necessary. Obviously it is necessary that the gas data be accurate before such installations are made. The presence or absence of gas caps is often discovered only by an examination of the gas-oil ratio history. Assume for instance that the gas-oil ratio decreased sharply during the early life of the pool; this would indicate depletion of a gas cap or gas sand. Some minor decrease in gas-oil ratio can be expected early in most fields. If the gas-oil ratio increases above that ratio which may be normal for the type of drive, a coning of gas cap gas into the well may be indicated. There is evidence that gas-oil ratio may be a function of the well production rate—that is, at too high or too low a production rate the ratio may be excessive, but at the optimum rate the ratio is a minimum. This condition probably exists only in reservoirs where there are sand streaks of high and low permeability.

Without gas measurements many of the above conditions would go unnoticed and perhaps the maximum amount of oil would not be obtained from the reservoir. Without accurate data on gas production the engineer's knowledge of the reservoir is too limited to allow him to provide management with proper recommendations on reservoir control.

Reservoir water is an item which is unsaleable and thus its accurate measurement is frequently ignored. Water, however, is one of the liquids existing in the reservoir and a knowledge of its behavior is essential for understanding reservoir performance. In water drive reservoirs the water production data may be the only factor indicating the reservoir control. A small amount of water produced at a constant rate may indicate that the water saturation of the sand is high enough to allow some flow: it may also indicate a small zone of water which contributes to the well a constant rate. If the water is a result of high water saturation in the oil sand it will quite often disappear whereas a water zone may continue to produce. A sudden influx of water can be the result of an edge water drive reaching the well or of water breaking into the well through a water sand as a result of a hole in the pipe or faulty cement job. The general case in a water drive field is where the water increases gradually from 0 to 100 per cent. This is characterized by an S shaped curve when per cent of water is plotted against cumulative oil production. For example:

The curve may be characteristic of both bottom water drive and edge water drive fields. Water entry into a well can be costly, both from loss of recoverable oil and expense of lifting the water. Many approaches are used to control the water. However, it is first necessary to know where the water comes from, and in many cases a knowledge of the water producing history is the only clue to its entry. Bottom water production can be detected if the per cent of water produced varies with the rate of flow of the oil. The higher the production rate the higher the water cut and if

(Continued on Page 20)



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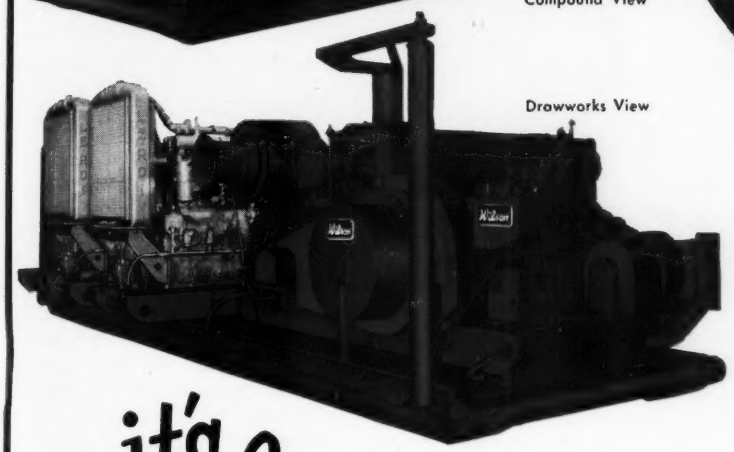

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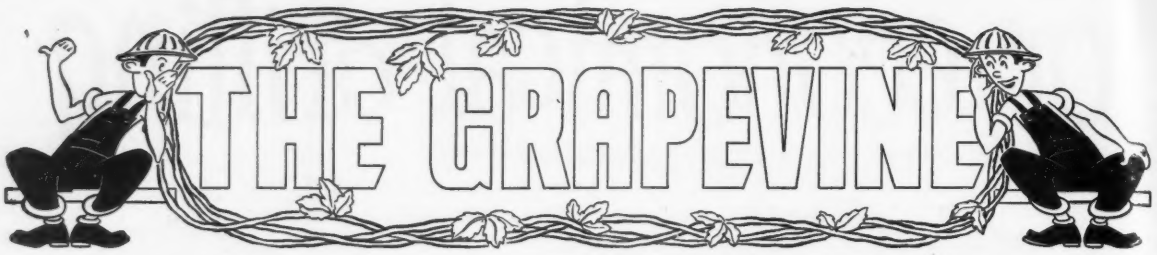


This compendium of nonentity is written from a spa, at which we are resting briefly in order to conserve sufficient energy to carry us through the Christmas whingding season. From past experience we know that it is not a thing to be taken lightly and we certainly don't intend to be caught this time with our calories down. It is probable that no other group on the wide earth celebrates Christmas quite so strenuously as the petrolic people. With **homo petroleumensis,** indeed, Xmas is not simply a day of revelry—it is, as we said before, a season. It opens early in December in a warming glare of bright lights, with mountains of **hors d'oeuvres,** a copious flow of energizing waters, and quipping and quaffing to the twelve signs of the zodiac. It fades out, pale and wan, in early January when the participants run out of red corpuscles and start to put in full working days again in a heroic effort to get back to what we used to call "normalcy." On these yuletide shenanigans we shall dilate anon. Meantime to those who are still with us, a speedy recovery from all the nights before, and the most of the best in 1953.

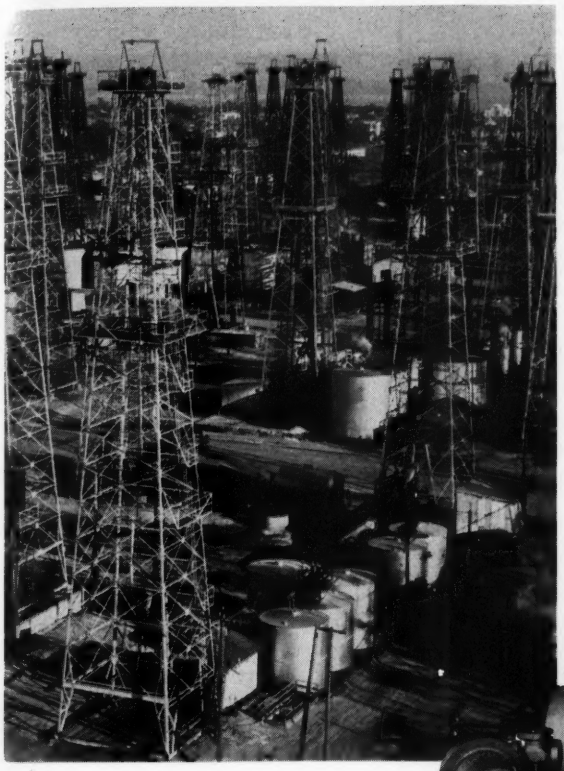
From John Abrams, petrolic historian, artist, and actual producer of the black golconda, we have just received a sheet of the Bradford Daily Era, dated May 7, 1878, in which there is a highly exciting three-column story of a disastrous fire in the noted oil town, written, and well written too, by Edward Everett Abrams, John's dad. It describes the conflagration in colorul terms, estimates the damage to person and property, and gives all the incidentals in true reporterial style. An especially interesting note to the main story was that "great quantities of wine, beer, and whiskey were consumed by the thirsty crowd." And, come to think of it, your tonsils do get parched if you watch a hot fire with your mouth open. A modest showman advertises in the same issue. "A colossal two-tent combination of melo-dramatic miracles, ethereal groupings, aerial evolutions, unearthly effects, mirth, mystery, and illustrious living prodigies! Also, great, gratuitous, free balloon ascension!"

Plans are well under way for the 175th meeting of the AIME which, for the first time in history, will take place in Los Angeles—at the Statler Hotel, on February 16-21, 1953. General chairman of the convention is tall, young-looking, pleasant-mannered Henry Mudd, scion of a noted mining house, whose business acumen is noticeable even in the conduct of the preparatory exercises. It is going to be a well coordinated and thoroughly productive meeting! That is obvious from the manner in which the preliminaries are being handled. Besides technical papers and discussions on matters of interest to all technological branches of the metals, mining, and petroleum industries, there have been scheduled stag dinners, a dinner dance, the big annual banquet, a series of local field trips, and some more ambitious post-convention tours, for example, to Mexico City, Grand Canyon, and Hawaii.

Assisting Henry Mudd in the general planning is Basil Kantzer, head of the Southern California Section, the capable Union Oiler whose administrative ability has been well demonstrated in his recent handling of a sizable OIIC assignment, with real executive talent. Basil is an artistic sort of chap who follows no stereotyped route. His pen and ink sketches and his ceramic creations are distinct expressions of an individual and unique concept of what he sees around him. He doesn't have too much time these days to indulge his hobbies but we rather fancy that when the time arrives that he can devote himself more fully to his hobbies, he will become just as well recognized for his art adventuring as he now is for his understanding of oil production and related matters.

One thing we like particularly about the festive season is that it brings to town, and gives us an opportunity to meet, many people who are ordinarily so far away, or just so fully occupied during the rest of the year that they don't show up too often in public. Among them are folk like the San Franciscans—Jules Toussaint, the affable Standard of Cal. production chief, who is widely known and stoutly admired down thisaway; Jim Gosline, the assistant production chief of the same illustrious institution, whom we have known since he was just a good looking kid up in Santa Paula—now, of course, he is a good looking grownup and a pretty consequential citizen besides; Owen Haynes, the Standard land chief, another of the industry's finer people; and John Thatcher, the Princetonian, who, in addition to having more on the ball than a big league pitcher, is a model of gentlemanly comportment and scholarliness for which we have long envied him terrifically. Then also, there is Graham Moody whose annual report on oil development of the State is an industry classic, and whose pleasing sense of oratorical humor is something that other, more ponderous platform performers could emulate to the distinct advantage of their audiences as well as themselves.

From Shell Oil Company, there is Jack Sembower, the distinguished looking grey thatched lad who, before taking over as public relations chief for Shell Oil Company, did an outstanding job as commander or something of the sort of the PT Boat flotilla down in the South Pacific. Incidentally, we never think of Jack without simultaneously thinking of Larry Kelley, that popular Notre Dame boy, who is now



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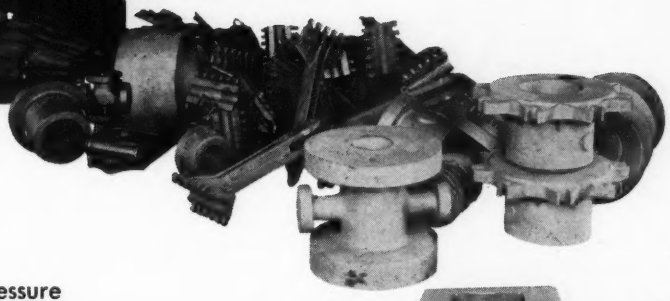

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back in Houston, Texas, and has made more friends there than a high school girl with a 20-room cottage at Balboa. Larry was on the PT boat detail, too, and we have good reason to be grateful for that fact. We believe that they were at least responsible, if not actually involved in the operation, for picking up our own offshoot, after he had been torpedoed by one submarine and rescued by another, in a hair-raising adventure off the coast of Zamboanga in the Philippines. The sub took him to Awe where he was taken aboard a PT boat and carried to Ouende. Thence he was flown in to Australia.

However, to get back on the beam, we might note also that the Christmas ingatherings usually give us a chance to exchange greetings with good friends in the field, like Ward Kelley, the Flying Horseman from Bakersfield, whom we usually meet at that wonderful Emsco-Youngstown party at the Ambassador. From the same area comes Harold McCarty, the Union Oiler with the most penetrating tenor in the oil business next to Ward Blodget. Incidentally, when that fiddle feud between Vic Fawcett, the Lufkin lilter, and Yascha Tuttle, the Standard symphonist, is finally decided by play-off at the Shrine Auditorium, or someplace big enough to hold the mob of music lovers that is bound to attend, we would suggest as an opener on the bill, a welkin shattering contest between Harold and Ward. They would have to sing separately, of course, for the same reason that soldiers are required to break step when crossing a bridge. If they should ever sing at the same time and by some misfortune their vibrations should synchronize, the building would unquestionably disintegrate like aspirin in a glass of water. It would also be necessary for the judge with the decibel meter to wear a diving helmet or something effective to protect his own tympanums against rupture. Someday a genius is going to arise and harness the destructive force of the McCarty-Blodget higher frequencies—and use it for breaking rocks or something.

We are also not unlikely to stagger into such seldom seen personalities as Fred Tyler, the Reed Roller Bit biggie, and one of the more noted of our rathskeller ivory wallopers. Fred just can't play a piano properly until he has first disemboweled the thing. He removes the back, front, top, sides, and all other non-essentials, until he literally has the instrument stripped down to its keyboard. Then he removes his own coat, rolls up his sleeves, sits down, and spanks out Minnie the Moocher with a delicacy of touch that reminds one of an extremely temperamental air-hammer. Come to think of it, Fred would make a dandy accompanist for a McCarty-Blodget duet.

That brings up the case of Roy Johnson, the Republic Supply Company veep with the strong Harvard accent. Roy is another lad who has no mercy on a Steinway. He once played piano in Hal Grayson's orchestra and we personally watched him being auditioned recently at the Thunderbird Ranch by Phil Harris. Exactly what Phil was looking for we don't know but we suspect that he was searching for someone to play a bit part in a boiler factory. Roy is what we Latin scholars call a **rara avis,** and we often wish we knew what it means. Anyway, he is a bit like Liberace in the fact that he can play any kind of music from the most profound classical stuff to the degradatingest boogie-woogie that was ever bashed out of a defenseless keyboard. He is quite unlike Liberace, however, in the fact that no matter what he is playing, from the most profound classic to the degradatingest boogie-woogie, the listener can't tell the difference. Only those of us who have studied the Johnson technique intimately know when he is cascading from one selection to another and we don't do it through recognizing the selection but by carefully watching the Johnsonian hoof-beat which is a dead give-away.

We had dinner a few evenings ago with Archie MacDonald, the noted yachtsman who never smokes anything but fish, Earle Jorgensen, proprietor of the steel organization by the same name, and one of the high

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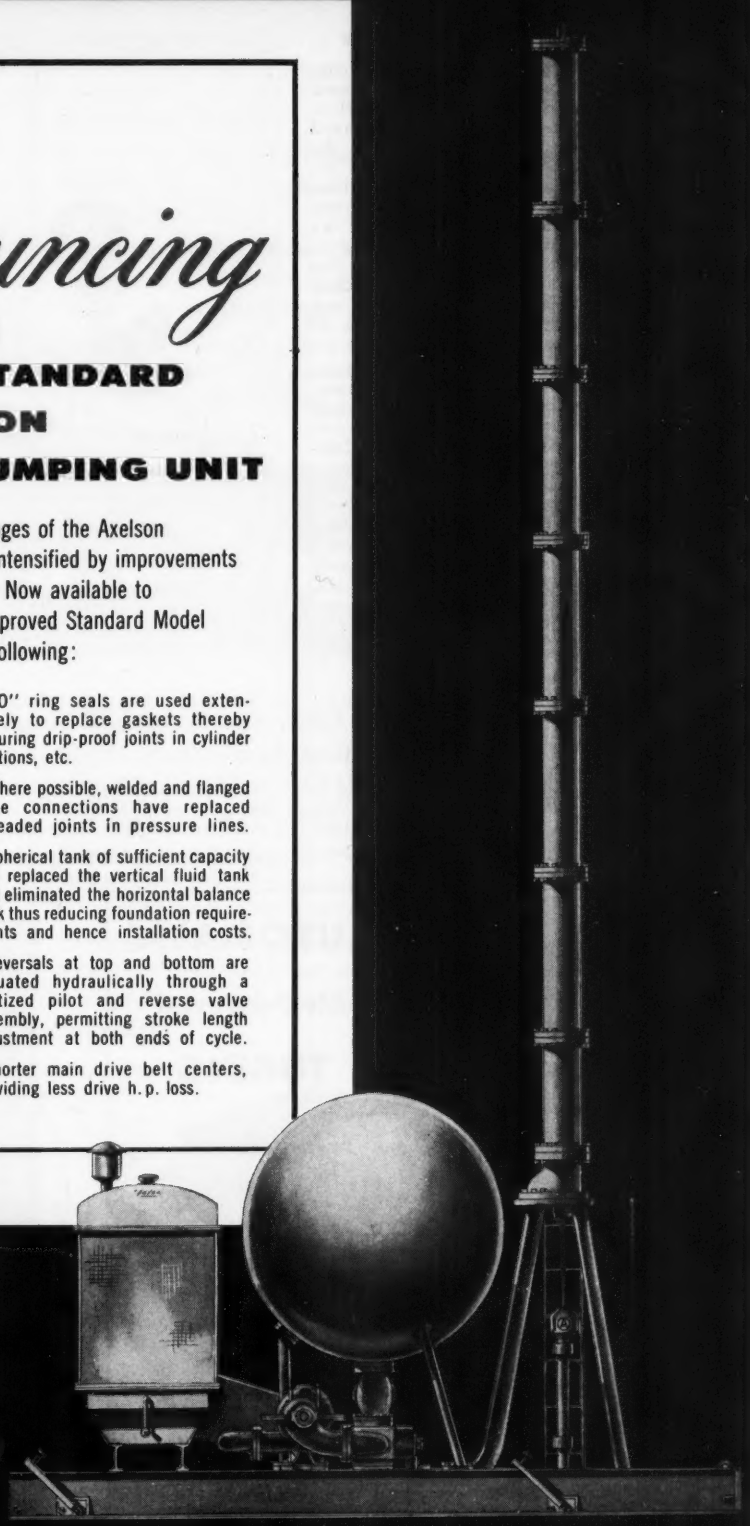

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Warren H. Kraft, vice president of Honolulu Oil Corporation, and a prominent citizen of Baghdad by the Bay, as Herb Caen calls it, is a mighty serious minded chap when he is at work, but has the admirable capacity to relax when the occasion is right and thoroughly enjoy himself. He was born in Denver, Colorado but realizing while still a child that the mile high city was no place for a future natural gasoline man, he packed his tiny goods and chattels and took off for California. He has been here ever since, and at the moment shows no disposition to leave.

He was graduated in chemical engineering from that illustrious institute of learning—Stanford University—in 1923, and had done some vacation work during his college years for Pacific Gas & Electric Company, but his first real oil industry attachment was with Standard of California. That, however, was for a comparatively brief term, for by 1925 he was performing as chemist for Honolulu Oil Corporation in Taft. Subsequently he became foreman in the gasoline department and finally manager of gas and gasoline operations, which responsibility he still discharges in a very capable way, along with the sun-

dry high-level executive chores that go with being a vice president.

Warren is a young looking chap but he is an old timer in the California Natural Gasoline Association. He graduated into the main group in Los Angeles from the Taft Chapter of which he is a past chairman. He has contributed generously to the technical works of this very productive organization and has frequently been cited for his particularly excellent aid on the Tank Truck Gauging Bulletin which is now an industry text-book. It is thus no surprise to find him officiating as current president of the California Natural Gasoline Association.

In his spare moments, Warren indulges a nautical yen as enthusiastically as he devotes himself to the capture of the more elusive hydrocarbons. He is the skipper of a yawl or a ketch or something on which at frequent intervals he sails boldly into the uttermost reaches of San Francisco Bay, even into the Straits of Carquinez, seeking out new territories which he can annex in the name of Honolulu Oil Corporation. Recently, his seafaring has been slightly curbed, however, while he is completing a new home in the vicinity of Burlingame, but there is little doubt that at the first opportunity, he will hitch his pants in the customary manner, warble one of his favorite chanties, and again take off over that part of the bounding main which lies inside the Golden Gate.

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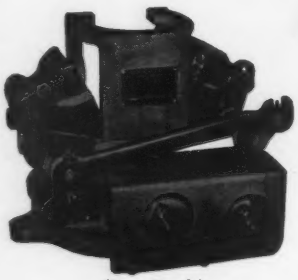
ranking citizens of our bailiwick; Charlie Napier, the Tide Water Associated Oil Company divot displacer and one of the most accurate 100 shooters in the game; and Dick Whelan, the Youngstown Steel Products Company higher-up who is perhaps the most dangerous gin rummy performer north of Flower Street. In the course of a welter of conversation we talked of the multitude of associations and social organizations that are in existence these days, and we again mentioned George O'Brien's affiliation with the Society For the Prevention of Calling Pullman Porters "George." That brought out the startling admission from Earle Jorgensen that he is a member of the Danish Women's Relief Society, and hardly had he



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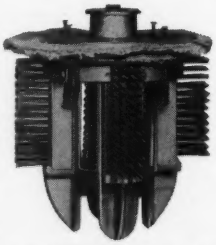

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Require special safety measures—it is safe and convenient to use. No gloves, goggles, masks, or extraordinary precautions are required.

Complicate ordinary production procedures—it does not render emulsified crudes more difficult to demulsify. It does not deposit well-plugging precipitates.

A cheap corrosion preventive is not necessarily economical. Safety in handling, ease of application and the avoidance of treating difficulties or formation-plugging precipitates are all values to be carefully considered in selecting a corrosion inhibitor.

KBB-2

TRETOLITE COMPANY

SAINT LOUIS 19, MISSOURI · LOS ANGELES 22, CALIF.

CORROSION INHIBITING • DEHYDRATING • DESALTING

WATER DE-OILING • SCALE PREVENTING • PARAFFIN REMOVING

laid his card out on the table to prove it, when along came the irrepressible Hans Ross with another one.

We imagine, by the way, that Jim MacDonald, owner of the stiffest left arm in western golf, must be back home again although we haven't seen him yet. We had a card from Rio de Janeiro, bearing some rather odious comparisons, on the basis of which we turned it over to the city attorney of Glendale, and if the writer is not hailed before the Glendale Committee on Un-Americanism, we'll certainly be disappointed. Incidentally, we understand that Jim and his by all means better-half, Marguerite, celebrated their 38th wedding anniversary on the S.S. Brazil, during its 38th voyage, in room 38, and were guests of honor at a sumptuous dinner given by the captain. Don't know whether or not we are being spoofed on all these 38's, but in any case, it looks as if we have caught Bob "Believe It Or Not" Ripley flatfooted again.

The other lunch hour we were trapped in a domino game at the Petroleum Club with Bob Smith, the noted Sunray legalite and proud possessor of the highest tenor in La Canada; Jim Hughes the Lane-Wells executive, whose after-dinner oratory is rapidly getting him acclaimed as the Chauncey Depew of the petroleum equipment industry; and Peg Whealton, the consultant, whose first name should have been a warning to us not to joust with him in the domino ring. However, as some smarty once said, "Fools walk in where angels fear to tread," and all we have to say is that if a merciful providence hadn't given us Bob Smith for a partner that pair of carnivores, Whealton and Hughes would undoubtedly have torn us from limb to limb. Bob, the noble fellow, being an experienced argufier and debater, parried every peg with a thrust, took out a writ of **habeas corpus** on the double five, and in consequence we emerged from the fracas, breathing heavily, but practically unhurt.

By way of last minute news, we note that Jack Bagnall, the Standard Oiler is vacating in Mexico City, and if he is really in need of a rest and some relaxation, we sincerely hope he will not run afoul of Charlie Schneider, a sort of night blooming narcissus who lives down thataway. Charlie is the most tireless nocturnal marauder since the saber-toothed tiger became extinct.

Charles W. Teater, who hails from Saginaw, Michigan, where the Hotel Bancroft originated a recipe for corn beef hash in 1865 and it is still being used, has entered the California oil industry. Teater, a leading Michigan operator for many years, retired in August, 1948, and then came to Los Angeles to take up residence. However, once an oilman always an oilman and in keeping with that axiom, Teater is back in harness and identified with development in California fields. His first big Michigan success came in 1933 when he opened the Porter Dundee field in Midland County. During his operations in the Wolverine State, the operator prospected in 28 counties and drilled a total of 184 wells of which 67 were commercial producers.

Southern Counties Gas Company's Edwin A. Wallace on December 1 took over his new post of division superintendent of the Texas pipeline department. Wallace previously was superintendent of the eastern division.

Johnny Meyer, who flew back to Los Angeles after planing over most of Europe and Africa on oil business, has taken off for Calgary, Alberta, also on petroleum matters.

Keeler-Whitman Co. Move to New Location

The Keeler-Whitman Co., factory representatives of Marsh Instrument Co., Davis Regulator Co., Fedders-Quigan Corp., Warren Engineering Co., Staples and Pfeiffer Co. and Kunkle Valve Co., have moved to new and larger quarters located at 4164 Santa Monica Blvd., Los Angeles 29. Phone NOrmandy 1-2174.

Good Field Data

(Continued from Page 12)

the oil rate is sufficiently reduced no water may be produced. This water is a result of "coning" as the water theoretically has the shape of a cone reaching up from the water table with the peak at the bottom of the well. As the water table moves upward the oil production rate at which no water is produced decreases and eventually the well must be plugged back. An accurate knowledge of the water cut history of a well is nesessary before the proper remedial work can be accomplished. There are many cases on record where a better idea of the reservoir could be obtained and more successful reconditioning jobs could be accomplished if a continuous and accurate record of water production were available.

This discussion has been an attempt to explain some of the engineering factors used in reservoir engineering study. It is important to know some of the reasons for obtaining and accurately reporting the factors that can be measured in the field. It is not sufficient to report "approximate" answers, like estimating water cut through use of the glass or thumb nail or reporting gas production based on the size of the flares. The answers can be just as wrong if the data are in error as when there are no data. Many serious financial decisions of the management are based on calculations of the engineers and these calculations are not one bit better than the data used. There is no excuse for bad field data. Accuracy of reporting field data is essential.

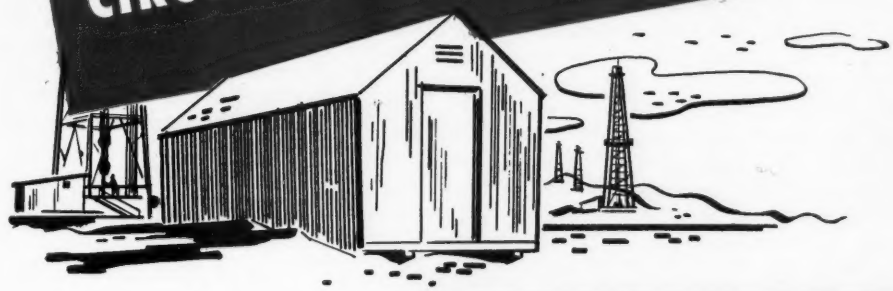
If the management will provide adequate measuring facilities and the field man will report data accurately, a better knowledge of reservoir performance and many addition dollars profit will be the inevitable result.

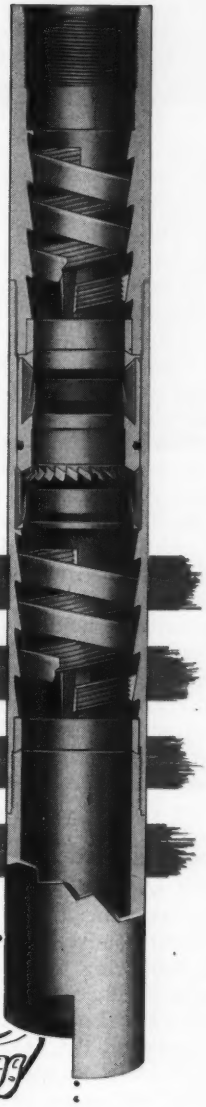
Presented before recent meeting A.P.I.

Lee R. Ellis, geological clerk in Ohio Oil Company's Bakersfield office, formerly was a teacher in city schools at Bakersfield. He is a graduate of Occidental College, Los Angeles.

"data for the doghouse"

on BOWEN RELEASING AND CIRCULATING OVERSHOTS





EASY FISH ENGAGEMENT

FULL NON-CRUSHING "GRAPPLE GRIP"

INSTANT RIGHT-TORQUE RELEASE WHEN READY

FULL TIME, HIGH-PRESSURE CIRCULATION

HERE'S A TOOL that gives you every advantage for quick recovery of fish to be externally engaged. Without adjustment it catches drill pipe—coupling *or* tool joint, whichever is up! And not only grips the fish in a patented non-crushing "grapple grip" that tightens as pull increases, but this Bowen Releasing and Circulating Overshot automatically mills and conditions jagged ends of the fish to permit full pack-off for high pressure circulation through the fish. A Bowen Releasing and Circulating Overshot is your best insurance against excessive lost time in the event of a twist-off—have one handy on your next well!

HERE'S HOW IT WORKS

TO ENGAGE THE FISH you need only connect the Bowen Overshot to the fishing string and run-in to the top of the fish. At this point, rotate right and let down until the fish enters the Overshot. For jagged ends of pipe, rotate slowly to the right as you gradually lower the fishing string. This allows the cutters to mill the jagged ends of the fish for full positive engagement and better seal when circulating. Once the Overshot is settled securely over the fish, neutralize the torque and pull up on the fishing string.
TO RELEASE FROM THE FISH drop the weight of the fishing string heavily against the Overshot. Then at the same time lift and rotate the fishing string to the right. This expands the spiralling grapple and permits easy pull-away from the fish.
TO CIRCULATE AND ROTATE when the fish does not come free on a straight pull, start circulation and while maintaining an upward pull, rotate *violently* as much as the fishing string will stand. The Bowen Releasing and Circulating Overshot is ruggedly built to withstand the toughest fishing jobs!

AND HERE'S THE REASON WHY

When a Bowen Releasing and Circulating Overshot is rotated to the right and lowered over the fish, drag of the fish against the bore of the grapple causes it to unwind and expand sufficiently to allow the fish to enter. As upward pull is exerted, the spiralling grapple is contracted by the tapers in the bowl to wedge and set the deep cut wickers about the entire circumference of the fish. The pipe grapple or the tool joint grapple grips firmly and evenly over a large area of the fish in much the same manner that the "Chinese Handcuff," illustrated at right, tightens when pull is exerted. As pull is increased, the grapple tightens about the fish and the greater the pull, the tighter the grip *without distortion* to the fish!

The Bowen "Grapple Grip" Principle.

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Field Development

Hollister Try Fishing

Stuck drill pipe is now the object of a fishing job in Balken & Krug's No. 1 wildcat well on land leased from the Ferry-Morse Seed Company on Sec. 20-12s-5e in the Hollister area of San Benito County. The venture is bottomed at 2450 ft. and the present mechanical troubles were the result of a gas blowout, which was estimated at more than 25,000,000 cubic ft. daily. The latest information disclosed that leasing for available ground in the area was quite brisk. Among the larger organizations holding land not far from the test are The Texas Company, Richfield Oil Corporation and General Petroleum Corporation. Contractor on the well is Krug Drilling Company. Lev Sacre and Ted Easton handled the engineering.

Rosedale Adds New Drilling

A newcomer to the Rosedale field in Kern County is British American Oil Producing Company, which has commenced work on its well on Sec. 23-29s-26e. Location is on the Taber property on the field's fringe. Approximately a quarter-mile south, Union Oil some months ago put down its first test in the Rosedale area to an unproductive 10,618 ft. Both the Stevens and the Vedder had nothing to offer in the way of commercial production. Humble Oil opened the field 15 months ago and now boasts high gravity oil production in quantity there.

Fruitvale Well Spuds

Contractor Crown Drilling Company has just spudded Charles H. Hornburg's No. 1 well on Sec. 23-29s-27e in Kern County's Fruitvale field.

Cymric Wildcat Begins Working

Work has been opened on Superior Oil Company's next drilling task in the Cymric area of Kern County. There the company is all set to drill Anderson No. 25 on Sec. 21-29s-21e, a southerly offset job to Intex Oil Company's Cymric No. 24, which was completed as a gas well. The latter topped the Carneros at 3567 ft., Phacoides at 4412 ft., Oceanic at 4772 ft. and Point of Rocks at 5343 ft.

Ventura Find May Be In Offing

Unofficial reports buzzing around in Ventura County oil circles credited Shell Oil Company's Taylor No. 390 on Sec. 19-3n-23w in the Ventura Avenue field with finding a new zone. The project, the deepest well in the field, at last reports was digging around 13,300 ft. The company at present has approximately 825 wells in the field producing a total of some 78,000 barrels a day.

Wheeler Ridge Wildcat Fishing

Richfield Oil Corporation is about to wind up a long and difficult fishing job in its KCL-D No. 16-28 test on Sec. 28-11n-20w in the Wheeler Ridge area. The venture went all the way to 11,816 ft., before it was plugged back to 10,285 ft. and 7-in. casing set at 9892 ft.

South Midway Discovery In

The South Midway area again has been enhanced by a discovery scored by Oceanic Oil Company. It was made through the medium of the company's CCMO No. B-1-2 on Sec. 2-32s-22e in the West Republic sector. The well, bottomed at 2223 ft., started off at the rate of 125 barrels of net 15.3 gravity oil a day. Closest production is one-quarter mile north on a Chanslor-Canfield Midway lease. The other month, Oceanic finaled a new zone discovery on the General American lease in the North Spellacy sector. Green & Heiser Drilling Company put the new producer down.

Careaga Well Still Testing

Tests of Western Gulf Oil Company's new Careaga No. 2 extension test on Sec. 8-8n-33w in the Careaga area of Santa Barbara County are continuing. On trial of the interval of 4523 and bottom at 4975 ft., the well flowed 7 barrels net of 33 gravity oil in 6 hours and 15 minutes. The well, drilled on contract by L. & F. Drilling Company, is located about 3000 ft. northeast of the No. 1.

Moody Gulch Wildcat Set

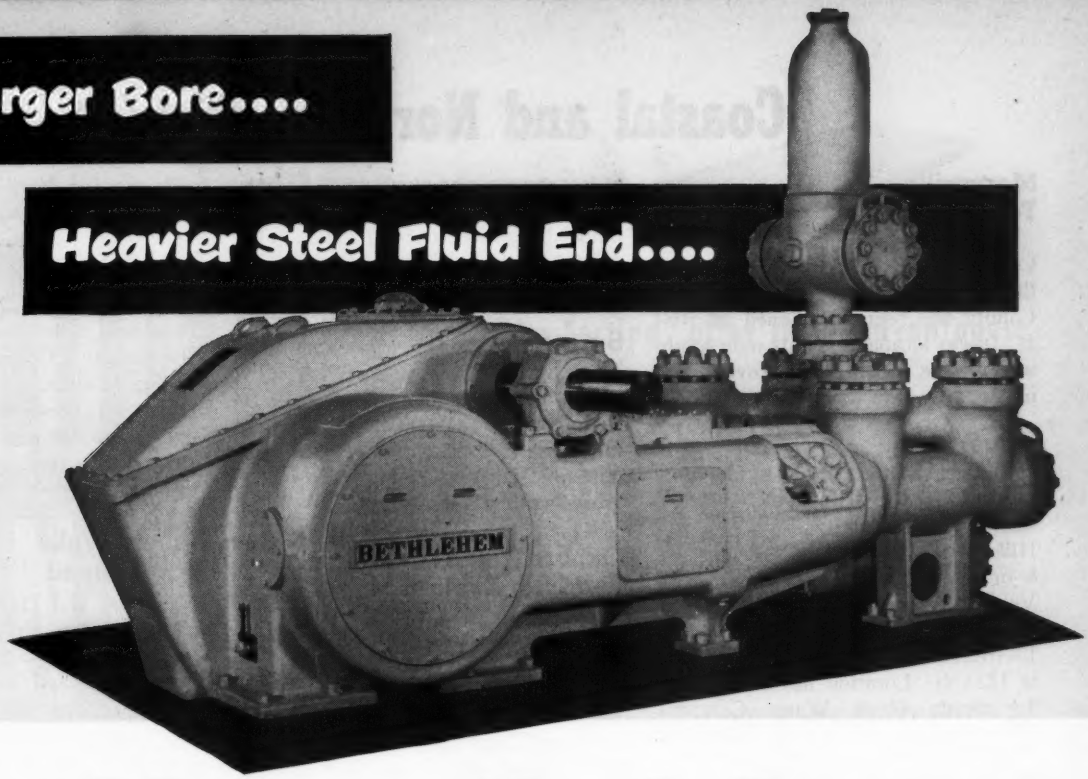
The Moody Gulch area, south of Alma in Santa Clara County, has been singled out by P. A. Kinard of Oakland for an interesting wildcat well known as No. K-1 on Sec. 8-9s-1w. Drilling was first inaugurated in the Moody Gulch field proper as far back as 1880.

Grapevine Wildcat Digs

In the Grapevine area south of the Tejon field, Richfield Oil Corporation has embarked upon an interesting wildcat called Tejon A No. 53-8 and located on Sec. 8-10n-19w. The venture, which at last reports was cutting deeper at 800 ft., is about one mile south of British American Oil's Chanac and Santa Margarita formation wells producing in the Tejon field. The present effort is expected to seek like production around 2500 or 2600 ft.

Larger Bore....

Heavier Steel Fluid End....



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These pumps are mighty rugged. Even the 225, smallest of the group, is a powerhouse. And the 600, head man of the lot, is the biggest, strongest unit Bethlehem has ever offered.

There are many features common to all—features that add to the smoothness, long life, and overall efficiency of the pumps. For example: complete oil-bath lubrication (trouble-free!). And roller bearings throughout. And such important details as API metal ring gaskets on valve covers, suction flanges, discharge flanges, stuffing boxes.

We can't possibly tell you the full story in this small space. But any time you say, a Bethlehem engineer will be glad to go over the units with you, point by point. There's a Bethlehem pump for every drilling job you have. Ask for full details today.

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600	8 in. x 18 in.

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In addition to its manufacturing plants and its sales and engineering service, Bethlehem Supply Company maintains almost 50 modern, up-to-the-minute stores throughout the oil fields. California locations are as follows:

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Marysville Test Quits

Richfield Oil Corporation's Butte Comm. B No. 6 on Sec. 7-15n-2e in the Marysville Buttes area of Sutter County has been abandoned at 5084 ft. It was located one-half mile southwest of the company's discovery well in the area.

Upper Ojai Wildcat Spuds

Spudded and drilling on down toward objective depth is Richfield Oil's Hillside No. 2 wildcat test on Sec. 8-4n-21w in the Upper Ojai area of Ventura County. At Timber Canyon, Richfield's West No. 5 test on Sec. 13-4n-21w continues to dig deeper at 1235 ft. Location has been staked for Santa Paula Water Company No. 1 prospect job on Sec. 10-4n-21w.

Ventura Nose Wildcat Works

In the Ventura Nose area of Ventura County, Standard Oil is drilling in the shallower formations with its Limonieira No. 1 explorer on Sec. 23-3n-22w. Contractor is Hayes & Sprague. Over in the Cat Canyon field in Santa Barbara County, Standard has finaled its Alexander Fee No. 62 on Sec. 21-9n-33w. The well at last reports was pumping 42 barrels a day, cutting 20 per cent from a plugged depth of 6854 ft. Alexander No. 64 on the section started off from 6618 ft. pumping all wash oil.

Saratoga Test Listed

The Texas Company is expected to begin work in the very near future on its Fossgreen A No. 1 exploratory hole on Sec. 5-8s-2w in the Saratoga area, Santa Clara County.

Oxnard Deep Try Ready to Explore

All set to drill for a look at the deeper formations in the Oxnard field in Ventura County is Standard of California's McInnes No. 1 on Sec. 6-1n-21w near the intersection of Sturgis and Rice roads. The project is interested primarily in what the middle and deeper Miocene may hold around 5000 ft. Zones now open in the area are roughly between 2500 and 3300 ft.

Maine Prairie Test Abandoned

East of the Maine Prairie field in Solano County, Amerada Petroleum Corporation has written off its P. & H. No. 1 extension test on Sec. 24-6n-2e at 6165 ft. Sidewall sampling was a prelude to abandonment.

Goleta Test Starts Drilling

On Sec. 3-4n-29w in Santa Barbara County's Goleta area, Terminal Drilling Company has commenced drilling its Western-Hollister No. 1 wildcat well. Dewitt Langford's Hollister No. 1 test near Gaviota is a location on Sec. 34-5n-33w.

Conejo Wells Programmed

Charles W. Heim has locations staked for three drilling jobs in Ventura County's shallow Conejo field. Marie No. 1 and No. 2 will drill on Sec. 32-2n-20w. Marie No. 3 will dig on Sec. 33-2n-20w.

Paris Valley Wildcat Drills

Monterey Oil Company is trying again for oil with its Ansberry Two No. 2 on Sec. 3-22s-9e in the Paris Valley area of Monterey County. McMullen Drilling Company, contractor, is putting down the well which at last reports was at a depth yet inconclusive. Ansberry Two No. 1 on Sec. 2-22s-9e was carried to a bottom of 1660 ft. in basal granitic conglomerate and abandoned. No. 2 is approximately 3800 ft. northwest of No. 1, which in turn was about one mile and one-half northwest of The Texas Company's Biaggi discovery at a shallow depth and a producer of but little oil.

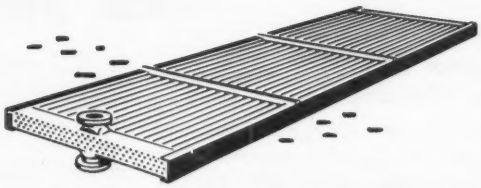
Petaluma Try Working

Cleanout operations evidently have been completed in Santa Rosa Exploration Company's Stephens-Rohnert No. 1 wildcat northwest of the town of Petaluma. The well, on Sec. 26-6n-8w in Sonoma County, recently resumed action at 5790 ft.

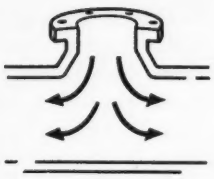
Winters Test Fails to Click

Yolo County's Winters area failed to give E. A. Bender's Wallace No. 1 wildcat on Sec. 12-8n-1w production and the well was consigned to oblivion at 4873 ft.

Santa Fe Drilling Company drilling Union Oil Company's well, Sansinena No. 73. Left to right: R. L. Cottle, driller; A. B. Wilson, derrick; P. D. Pitchford, rotary helper; Leo M. Blom, rotary helper; "Way" Petty, rotary helper.

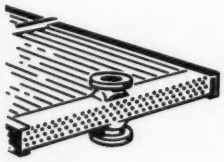


Transaire Sections offer these advantages:



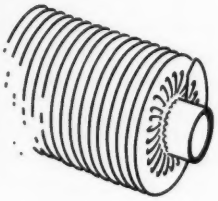
1. Less pressure drop

Inlet and outlet nozzles in the header-manifold allow for a full pipe cross sectional area opening into the header with curved entrance to keep velocity pressure loss at a minimum. Note how the nozzle widens out below the inlet flange permitting a smoother, more natural flow into the header. Tube holes are taper countersunk for the same reason.



2. Four-to-one safety factor

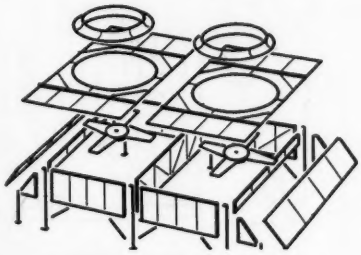
Headers are either cast iron or fabricated steel and in either case are *unconditionally guaranteed* to withstand test pressures of four times the design pressure. Brass header plugs provide quick easy access to tube ends for cleaning or replacement without requiring special tools.



3. More heat transfer surface

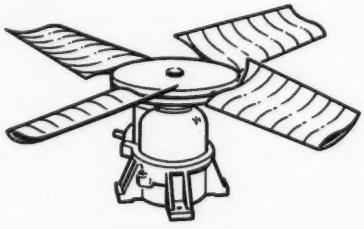
Fins are crimped, and crimped fins present more surface area to tubes which in turn means more metal-to-metal contact and greater dissipation of heat. The crimp also presents more fin surface to passing air. Tubes are available either in admiralty, steel or other materials as required. Fins of copper or aluminum.

Fluor Structures provide these advantages:



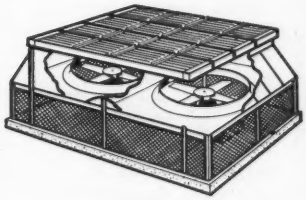
1. Rigidity of steel

The entire steel structure is conservatively designed with "truss-type" construction. All parts are prefabricated to size to fit all units which greatly facilitates field erection work. Fluor's wide experience as designers and constructors of plants and equipment for industry insures proper application and successful operation of every Fin-Fan installation.



2. Mechanical excellence

Mechanical equipment for Fluor Fin-Fans is built to withstand the most rigorous heat transfer requirements. 4 basic gear units cover 4 different and distinct horsepower ranges. This, coupled with a choice of fan assemblies ranging up to 20' diameter with 2, 3, 4 or 6 blades per fan unit, enables the proper combination of gears and fans for maximum efficiency.



3. Meet space requirements

Fluor Fin-Fans are adaptable to available space. They may be connected in series for long temperature ranges, or in parallel for large capacities. Single units can be used for multiple duties in widely diversified applications economically and at low maintenance costs. Parts are simple and standardized to save erection time in the field.

San Joaquin Valley

Cuyuma Valley Wells Working

When C. W. Colgrove recently abandoned his Kirschenmann No. 67-22 wildcat on Sec. 22-10n-26w at 9631 ft., many observers inclined toward the belief that the Central Cuyama field in Santa Barbara County will sustain no more than one well. It was Seaboard Oil Company which opened the field on May, 1951, with a producer on Sec. 22-10n-26w. The initial yield was 125 barrels of net 45 gravity oil from an interval extending roughly from 7270 to 7370 ft. Since the first success, Richfield has undertaken a number of unsuccessful extension tests in the sector. Colgrove's duster was a northwest offset well to the discovery and it was abandoned at 9631 ft. A half-dozen miles northeast of the South Cuyama field, an Acme Drilling Company rig is drilling at 1140 ft. with Colgrove's Russell No. 22-4A on Sec. 4A-10n-26w. Southwest of the Morales Canyon field, the operator has location staked for Russell No. 82-16A on Sec. 16A-11n-28w. Off the southeast border of the South Cuyama field, M. J. M. & M. Oil Company has abandoned its Wilshire-USL No. 1 explorer on Sec. 8-9n-26w at a redrilled depth of 9052 ft. The project was spudded in last June and carried to a total bottom of 9567 ft. Geology evidently was interesting and the well subsequently plugged back and redrilled but ensuing events failed to live up to expectations.

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Round Mountain Wildcat Abandoned

Bottomed at 2166 ft. in gray Vedder formation, Harry S. Rothschild has pulled out of his Coffee No. 2 wildcat well in the Coffee Canyon sector at Kern County's Round Mountain area. Rothschild is president of the Rothschild Oil Company, a producing and refinery organization with headquarters at Santa Fe Springs.

Greeley Try Quits

Having found the objective Stevens zone gray and barren, Standard of California has abandoned its KCL No. 32-12 on Sec. 16-29s-26e in the East Greeley area at a depth of 8187 ft. Two miles northwest of McKittrick, Standard is drilling at 3340 ft. with its No. 52-Z test on Sec. 7-30s-22e, which probably will not be content until at least 6000 ft. has been logged. Standard boasts production a half-mile east of the new wildcat from formations between 1100 and 2200 ft. This output has endured for more than a quarter century.

Old River Try Forsaken

Drilled to a total depth of 13,690 ft. without encounter with commercial shows resulted in abandonment of Humble Oil's KCL-D No. 2 on Sec. 15-30s-27e at Old River in Kern County. Located three miles off the south end of the Fruitvale field, the well underwent a number of formation tests, but they all were more or less negative from a production standpoint. In the Rosedale area, Humble's KCL-C No. 11 on Sec. 14-29s-26e was last reported digging at 1956 ft.

Paloma Test Hits Trouble

Ohio Oil Company's important deep test in the Paloma field is down 16,495 ft. Normal drilling operations, however, were halted at that depth when mechanical difficulties brought about a fishing job. This ambitious test may go as deep as 20,000 ft.

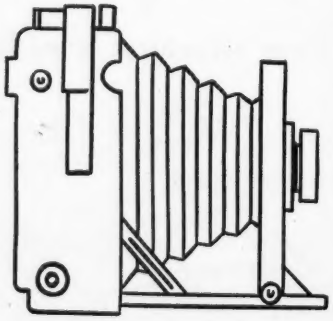
Willow Creek Wildcat Digs

An area hitherto untouched by the wildcatter's drill is the scene of a well making hole under the banner of Edward Nepple. The venture is tagged Duke Empire No. 1 and is drilling through the shallower formations on Sec. 34-15s-7e or 22 miles southeast of the town of Hollister in San Benito County. In the Hollister sector, Monterey Oil & Gas Exploration Company's Grant No. 1 on Sec. 1-12s-5e continues to probe ahead below 1000 ft. The 10-in. surface pipe was cemented at 200 ft.

Bellevue Well Being Reworked

Superior Oil Company has begun work on its Berchtold No. 25-35 wildcat on Sec. 35-29s-26e in the Bellevue area, which was originally a Standard Oil Company project and known, when drilled unsuccessfully five years ago, as Robbins Comm. No. 1. Present plans call for whipstocking and redrilling the well to the Lower Ste-

GET THE PICTURE



More and more operators are getting the picture on their wildcat wells by using

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	Well "A"	Well "B"		Well "C"	
		"A"	"B"	"C"	
Well Number:		Sept., 1935	March, 1936	Dec., 1935	
Date Unit Installed:		136,500	132,300	134,400	
Hours Operated, Total:		1,108,719	1,009,414	987,280	
Fluid Pumped (bbls.):		6,500	6,500	6,500	
Well Depth, in ft.		$18.20	$38.60	$41.10	
Yearly Repair Cost:					

Although these three records are remarkable, there are hundreds of Lufkin Units in Oklahoma with equal, or better, records.

Cordially Yours,
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vens oil sand zone for production if the new quest finds such a trip necessary. The return visit to the well by the new operator disclosed that the celler was still in usable shape as was also the surface string.

Temblor Test Preps To Dig

Slightly more than a mile northwest of wells producing at McKittrick, Standard of California is preparing to drill its Stafford-Bell No. 54 wildcat on Sec. 3-30s-21e in the Temblor Range Anticline area of Kern County.

Dagany Gap Wildcat Quits

M J M & M Oil Company of San Francisco has abandoned its second well at Dagany Gap at a depth of 1058 ft. The test, known as University No. 2 and located on Sec. 3-25s-18e, topped the Point of Rocks at 590 ft. The company is preparing to start another well at Poso Creek in combination with another operator.

Temblor Hills Wildcat Drilling

In Kern County's Temblor Hills area, Southern California Petroleum Corporation is drilling steadily ahead below 1500 ft. with its St. Anthony-Jasper-Hagood No. 1 wildcat well on Sec. 18-30s-21e. It is working with a Terminal Drilling Company contract rig.

Pyramid Hills Test Drills Ahead

At Pyramid Hills at the northern fringe of the Devils Den field in Kern County, Gilliland Oil Company and C. O. Davis continues to dig ahead at 860 ft. with San Francisco and Fresno Land Company No. 10-3 wildcat on Sec. 10-25s-18e. Prime targets are the Escudo and Carneros sands. Elko Drilling Company's Elko-Strode No. 1 test on Sec. 15-25s-15e at Devils Den is still idle at a depth approximating 2040 ft.

Tehachapi Wildcat Digs

Nine miles west of the town of Tehachapi in Kern County, Daniele Amfitheatrof & Associates is drilling at a relatively shallow level with Shomepen No. 1 exploratory well on Sec. 26-32s-31e. Barnes & Shadrick are putting the test down, which is on ground a couple of miles from the former prison for women. Historically, it appears that in this area only one other test has ever been drilled. It was undertaken by A. J. Rogers and H. J. Kirschenmann about two miles southeast of the new test. This earlier try was drilled about three years ago and subsequently abandoned at 822 ft.

Cheney Ranch Wildcat Rigged

Approximately six miles northwest of production, E. A. Bender's Chaunett No. 1 wildcat on Sec. 8-14s-12e in the Cheney Ranch area of Fresno County is ready to drill for new oil. Location also is three miles north of a wildcat put down by Jergins Oil Company to a dry and dusty 4300 ft. Richfield Oil's D. A. Myers No. 1 on Sec. 14-17s-15e on the Turk Anticline has gone the way of all dusters at 9860 ft. Results would seem to indicate the company's discovery there to be of very limited scope. It was Richfield's third areal try.

Ant Hill Try Fails

Wildcat efforts to poke into new oil supplies northeast of the Ant Hill field in Kern County proved unavailing for J. H. Maurer and Arthur C. Fisher's Linda N. 11 on Sec. 11-29s-29e and the log was closed at 1246 ft.

Argentine Oil Strike

Argentine drillers have uncorked a rich oil field at Campo Duran in the province of Salta. The discovery well lies in the foothills of the Andes and from all reports topped the oil sand around 11,000 ft., which on test produced more than 2000 barrels of crude oil and 20,000,000 cubic ft. of gas a day.

Atlas Chain Names Barnes & Delaney As Distributor

The Atlas Chain and Manufacturing Co., Philadelphia, makers of Atlas "Super-Life" Roller Chain, announces the appointment of Barnes & Delaney, Atlantic and Willow Streets, Long Beach, California, as an Atlas distributor.

At their Long Beach warehouse, Barnes and Delaney will carry a full stock of Atlas Roller chain and chain parts for the oil field industry in Southern California.

Barnes and Delaney have been known for sometime as authorities in the use of rubber belting, V-belts and industrial rubber goods.

McAteer Drilling Co. is contractor for Royalty Service Corp. on their Compton No. 1 well. Back row, left to right: John Brixey, driller; M. P. Sheflet, tool pusher; C. C. Rucker, floorman; Wilson Brixey, derrick. Front row, left to right: Joe Hensley, mechanic; Pat Patterson, floorman.

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Pacific works for the production superintendent in the field . . . each one is our boss. We serve them. We analyze their individual sand problems, and we recommend the most economical and dependable method for their solution. We meet their exact specifications. We have the experts, the specialized equipment, the ability to produce and deliver on schedule.

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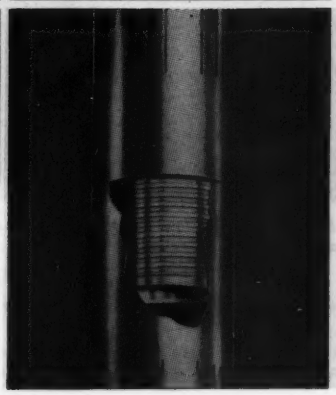

PIPE THREADING — Pipe slotting and threading is a "one stop" service at Pacific. Pacific's Ventura Tool "Flush Joint," API "Round" and "V" Threads are available.

Los Angeles Basin

West Newport Adds Fault Block

Sierra Oil Company's Farnsworth No. 2 extension test on Sec. 12-6s-11w in the West Newport area of Orange County has been completed at 3501 ft. in the B zone in a new fault block. It produced initially through a half-inch bean at the rate of 210 barrels of 26 gravity oil a day. The company is now drilling its Farnsworth No. 3, a Bolsa zone well, in the same section. Pacific Drilling Company put down No. 2 and is doing likewise on the current effort. Douglas Oil Company's Douglas-Newland No. 1 wildcat on Sec. 1-6s-10w is all set to drill.

Leffingwell Wildcat Pumps

Pumping an unestimated amount of crude oil, The Texas Company evidently has at least a small producer with its McNally Ranch B No. 10-1 wildcat on Sec. 10-3s-11w at Leffingwell, Los Angeles County. The drill site is between Leffingwell road and Imperial highway near Luitweiler road on a 160-acre lease. The remaining land totaling about 1700 acres is held by Ted Sterling and Paul Trousdale. Pike Drilling Company drilled the new well.

Movie Studio Drilling Asked

Universal Consolidated Oil Company has filed an appeal from a denial by the Los Angeles City Planning Commission for a request to establish an oil drilling district on the 20th Century-Fox studio property. A company representative has pointed out that operations would be carried out with underground installation which would eliminate any possible objectionable features.

Randsburg Wildcat Dry

A final depth of 2468 ft. wound up wildcat activities of Fremont Development Company with its Fremont No. 1 well on Sec. 34-12n-4w at Randsburg, San Bernardino County. In the Chino Hills area on Sec. 5-3s-8w, Champion, Hemphill & Schneider is preparing to resume operations at 1240 ft. with Champion No. 1 test.

Standard Oil Co.'s wildcat Midway 29D-27 in Midway Field near Highway 33 with Thomas Pike Drilling Co., contractor. Left to right: A. G. Prince, lead tong; E. E. Prince, pipe racker; W. N. Thomas, cat head; G. F. Waters, derrick; E. L. Reel, driller; Tiny Martin, in rear, tool pusher. This crew has the top hole record for Pike Drilling Company, having drilled 1264 feet in five and one half hours in Firebaugh for Sunray Oil Company.

Buena Park Test Slated

The Texas Company's Mills No. 1 wildcat test on Sec. 36-3s-11w on land east of Orange County's Buena Park is in line for double-duty exploration. The well was spudded in last March 29 and after being whipstocked to the city of Fullerton was abandoned last May 29 at a total depth of 10,020 ft. The plan now being worked out is to set whipstock near 4500 ft. and redrill a straight hole for production. Northeast of Anaheim, Texaco is all set to spud its Dinkler No. 1 wildcat on Sec. 7-4s-9w.

East Coyote Test Pumping

Sunhill Petroleum Company has completed its Edwards No. 1 test on Sec. 16-3s-10w in the East Coyote area at a redrilled depth of 6345 ft. pumping 30 barrels of 24.5 gravity oil a day. The well the first time down went to 6605 ft.

Castaic Venture Drilling Deeper

T. P. G. Oil Company—Charles W. Teater, Henry Page and Don Gates—has taken over the Paradise Valley Oil Company's Mary Austin No. 1 on Sec. 28-6n-17w in Los Angeles County and is carrying the well on down from 4828 ft. Location is about five miles north of the town of Castaic and one mile east of the old Ridge route, where in recent years several companies have conducted geological work. The wildcat was spudded early in December of 1950 and to present depth was credited with showings at several levels. These showings attracted considerable interest and born of this was leasing along the Ridge route as far north as Gorman. Under the new set up the well will probably go to at least 7000 ft. The lease embraces no less than 800 acres surrounded by holdings of Union Oil, The Texas Company, Continental Oil and others. Union is understood to be a dry hole contributor if the well is taken down to 7000 ft. or more. Teater before coming to California was a millionaire operator in Michigan. Don Gates and Henry Page are owners of the Gates and Page Lumber Company in Monrovia.

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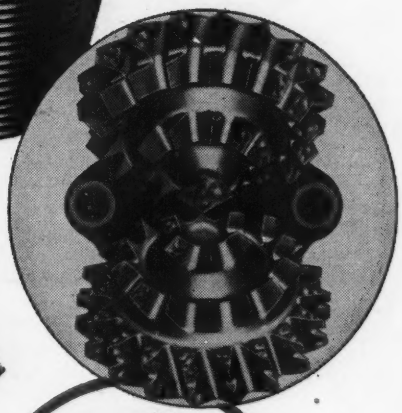

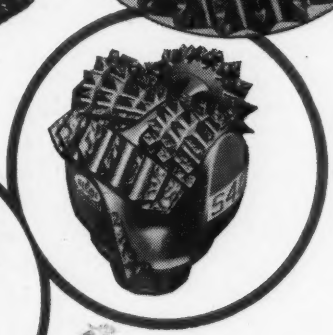

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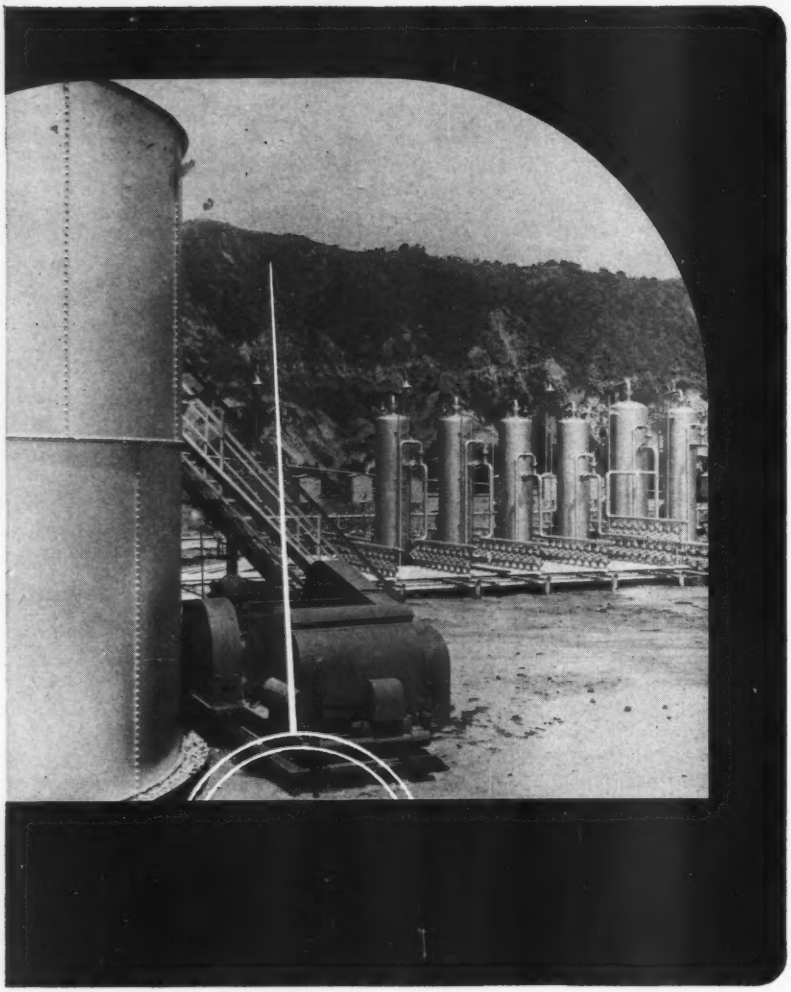

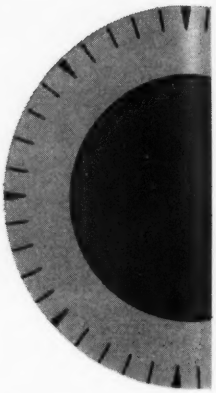

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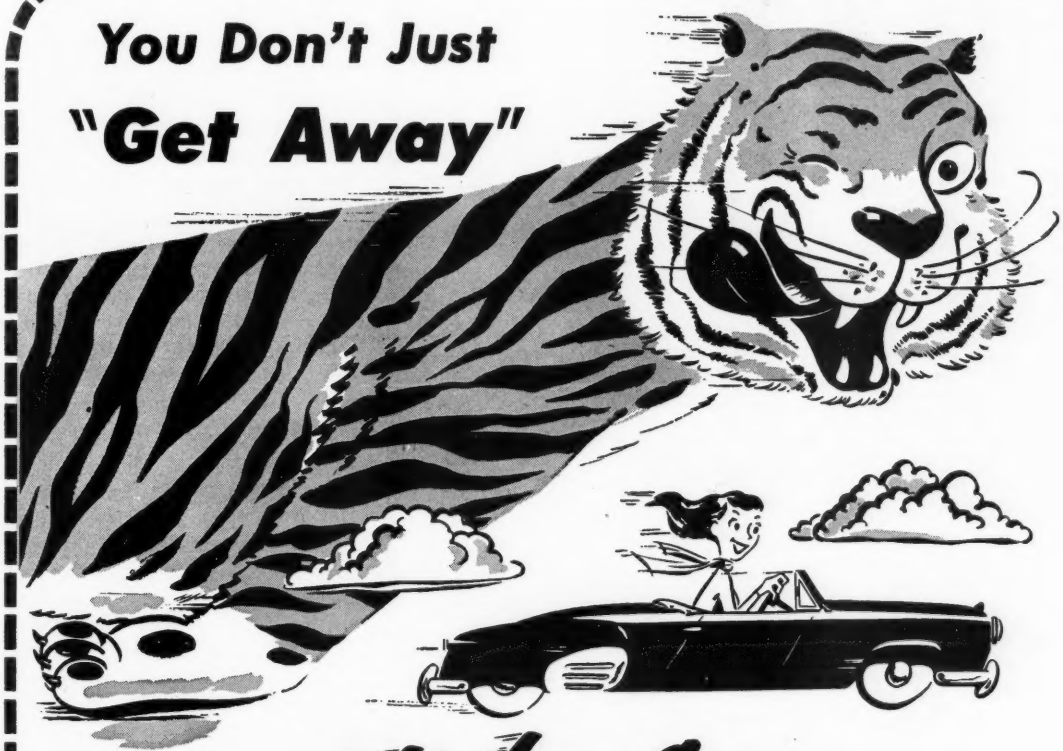

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Try a tank of Flying "A" Ethyl and notice the difference in your car's pick-up. Feel the extra smoothness as you glide away from a standing start...as you gather speed on the straight-away. Listen . . . and you'll hear practically nothing, for the abundant anti-knock properties of this Tiger Power gasoline keep motors kitten-quiet.

"Tiger Power" is our way of explaining in a word that Flying "A" Ethyl is power-packed with "tiger stocks"... the most *potent* motor fuel ingredient ever refined. Yes, this great gasoline is brimming with special eager-for-action gasoline molecules that pack a concentrated wallop... a better blend of balanced power.

Next time, fill your tank with Flying "A" Ethyl, and get going with Tiger Power.

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FLYING A ETHYL GASOLINE

POWER-PACKED with "TIGER STOCKS" ...the most potent motor-fuel ingredient ever refined.

TIDE WATER ASSOCIATED OIL COMPANY

Riverside Test Listed

S. V. Smith is ready to start an interesting exploratory well on Sec. 35-2s-2w east of the city of Riverside in Riverside County. The well is called Haskell No. 1.

Malibu Leasing Program Abandoned

Because a sufficient number of landowners in the Malibu area did not see fit to lease their lands, a proposed and important exploratory campaign for the Los Angeles Basin has been abandoned. This was evident in an announcement by Loren L. Hillman, Inc., that it was relinquishing and quitclaiming some 7000 acres leased at Malibu. The Hillman organization gave much time and expanded many thousands of dollars in gathering the leases. However, they were not deemed concentrated enough to encourage wildcatting operations. Most of the ground leased was several miles back from the ocean. Geologists, who have studied the area, view the production possibilities of Malibu with high favor.

Oceanside Test Ground

The Oceanside area of San Diego County is the scene of new wildcat drilling. It is being sponsored by Grober & Associates with Estes No. 1 on Sec. 21 and Perry No. 1 on Sec. 33-12s-4w. During 1948, Charles F. Holmes drilled two dry wells in the area to depths of 1028 and 2248 ft., respectively. They were located on Sec. 31-11s-4w. Inland from Oceanside in the Vista avocado country, Lucian Tavis Exploration Company drilled a brace of wildcats on Sec. 14-11s-4w during the past year. At present they are standing idle at 610 and 653 ft., respectively.

Newhall Test Drilling Ahead

Jack Watkins is digging below 1100 ft. with his Legion No. 1 wildcat test south of the town of Newhall on Sec. 11-3n-16w. It is presently designed as a conclusive test.

Santa Fe Well Quits

Union Oil Company's extension test on Sec. 5-3s-11w in the Santa Fe Springs field has been abandoned at a redrilled depth of 5100 ft. following runs of electric log and dipmeter. The project, labeled Carmenita Comm. No. 1, the first time down drilled to 8445 ft.

We Wish
You a
Merry,
Merry Xmas
and a
Happy and
Prosperous
New Year

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York 7494

Little Tujunga Wildcat Given Up

Efforts of Intex Oil Company to uncover petroleum in the Little Tujunga area of Los Angeles apparently were of no avail. The company's Cleeves No. 1 on Sec. 33-3n-14w folded up at 4250 ft. with fish still in hole. Top of fish was at 3531 ft.

Dos Palos Try Rigged

Standard of California's Redfern No. 51 wildcat test on Sec. 28-11s-12e at Dos Palos in Merced County has been spudded and is drilling rapidly ahead. It is located no great distance northeast of unsuccessful wildcat operations carried on about 18 years ago by Milham Exploration Company and Bergman Oil Company, respectively. Obispo Oil Company and Brookline Oil Company also tried their luck with a joint well about eight years ago on Sec. 1-12s-11e. They found nothing of commercial interest.

Basolo Test Put On Pump

The Texas Company's Elkins No. 2 on Sec. 5-3n-19w in the Basolo sector of Ventura County has been placed on the pump for an initial yield of 100 barrels of water daily. Drilled to a bottom of 4516 ft., the project was plugged back to 4200 ft. Intervals perforated extend from 4045 to 4183 ft.

Hopper Canyon Well Stands Idle

In the Hopper Canyon field in Ventura County, E. H. A. Andrews' Commander No. A-13-3 well on Sec. 13-4n-19w is currently standing idle at 1010 ft. At Shiells Canyon, The Texas Company has location staked for its W.P.H. Fee NCT-One No. 8 on Sec. 5-3n-19w.

W. L. Stewart, Jr., Union Oil Company executive vice president, has been named chairman of the American Petroleum Institute, division of refining, smoke and fumes committee.

*If you've got any pipe that needs perforating, threading or straightening, call Long Beach 4-8181 or Miller 3-8302 (Ventura).

Personalities IN THE NEWS

Sanders and Surber Advance at G.P.

Paul Sanders has been named assistant manager of General Petroleum's Torrance refinery, according to A. E. Thompson, the refinery's manager.

Paul Sanders

In addition, Thompson revealed that E. G. Surber has been advanced to the post of Superintendent of the plant.

Sanders, a veteran of 33 years with General Petroleum, has been Superintendent of the refinery since 1945. In February, 1929, Sanders and 33 men put the then tiny refinery "on stream" for the first time. Since 1929 the Torrance installation has grown into one of the largest petroleum refineries in the West.

Surber has been with General Petroleum since 1923. He was employed at the company's Vernon manufacturing plant until 1941, when he became a shift foreman at Torrance. Since January, 1951, he has been foreman of the refinery's tank farm.

Hollis Wood, a rodman in Shell Oil Company's Los Angeles exploration area, is now an ex-fisherman. His retirement from the sport came about from being capsized at sea with a companion, Ernie Wielbalk of Shell's San Francisco district. The two were returning from a fishing expedition between Catalina Island and Balboa about 3:30 in the afternoon when they were caught in a treacherous squall four miles offshore. Wood's 12-ft. outboard motor boat was overturned and the fishermen tossed into giant size swells. They tied a rope to the boat and hung on. It was not until 9:30 the next morning that they were picked up 10 miles off San Clemente. They had drifted some 30 miles during the long night. Whether or not Wood's retirement is permanent or only temporary will be determined when the next fishing season rolls around.

In a recent speech before the Pacific Supply Cooperative at Portland, Oregon, General Petroleum Corporation vice president and director of marketing V. A. Bellman related that Steve Bechtel made known that it was Bob Minckler, president of General Petroleum, who first gave him the idea for the Trans Mountain pipeline.

Independent operators Ferguson & Bosworth have announced the opening of a new headquarters at 307 Fourth street in Bakersfield. Mailing address is PO Box 245, Station B and new telephone number is Bakersfield 3-4177.

Now at work in Shell Oil's Los Angeles Basin division is John R. Sansone, the company's senior exploitation engineer, who was transferred from the San Joaquin Valley division at Bakersfield.

Powell Elected Vice Pres. Of Macmillan

William H. (Bill) Powell, who first went to work for the Macmillan Petroleum Corporation in 1924 as a "rough neck" at the Signal Hill refinery, recently assumed new executive duties, as vice president in charge of manufacturing and member of the board of directors.

W. H. Powell

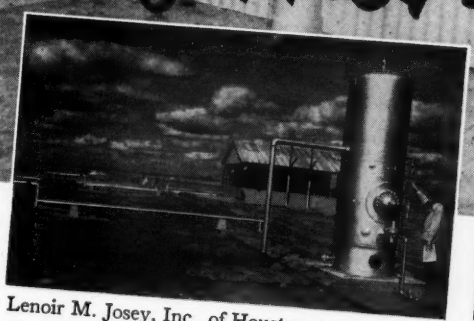
Powell, well known throughout the industry as a refining engineer, has been continuously with Macmillan for 28 years. He began his career as an oil field laborer at the age of 18 and has steadily advanced by hard work and constant study of refining problems to his new position.

From 1937 to 1947 he was superintendent of the Signal Hill refinery and for the past five years has been in charge of Macmillan's El Dorado, Arkansas refinery.

No immediate organizational changes are planned, Powell said.

Although he will divide his time between Arkansas and California, Powell will for the present maintain residence at El Dorado. A daughter, Patsy Lee, attends the University of Arkansas.

"never junked a WAUKESHA!"



Lenoir M. Josey, Inc., of Houston, saves gas with closed gas lift on 5 wells in Hutchins-Kubela field, Wharton County, near El Campo, Texas.

A Waukesha 6-LROU, 6-cyl., 8½ x 8½, 2894 cu. in. unit powers pump in compressor plant shown. Inlet gas scrubber (*left*) surge "bottles" (*right*).

194

The new Model LROU Waukesha which you recently installed in our gas lift plant at El Campo, just "fills the bill". It has sufficient power to take care of the heavy loads when the suction is flooded with gas lift gas from the wells, yet it runs smooth during the periods when the suction is low and the load is off.

This is the third installation of Waukesha in our campaign to eliminate flare gas on leases in Texas. During the past year, we have spent nearly a quarter of a million dollars in conservation practices and Waukesha Engines have figured in every installation. This was prompted by our records showing long service life and low costs of upkeep on our Waukesha installations.

We have 38 Waukeshas of various models and ages on our producing leases. Many of these are 10 to 15 years old and we have never junked a Waukesha Engine. For this reason, we have standardized as near as possible on Waukesha Engines.

W. D. Carleton

W. D. Carleton, Prod. Supt.
LENOIR M. JOSEY, INC.

Send for Waukesha Bulletin No. 1560

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • New York • Tulsa • Los Angeles

S. Z. Natcher, Standard Oil Company of California, vice president and chairman of the House Committee, admiring gold mounted cribbage board held by Olen Lane, Continental Oil Co., who was the winner of the First Singles Round Robin Cribbage Tournament recently completed by the Petroleum Club of Los Angeles. Looking on is Glen W. Ledingham, Western Gulf Oil Co., finalist in this tournament, holding the gold mounted cribbage board which was his prize.

Professor J. Tuzo Wilson of the University of Toronto was the featured speaker at a joint dinner meeting of the Society of Exploration Geophysicists and the San Joaquin Valley Geological Society. The meeting was held at the El Tejon Hotel in Bakersfield. The learned man discussed results of geological and geophysical studies of the Canadian Shield made for the purpose of determining its origin and structure. As professor of geophysics at the University of Toronto, Mr. Wilson is in charge of the largest program of geophysical instruction and research to be found in any educational institution in the Maple Leaf Country.

One of the top awards of the petroleum industry, a certificate of merit from the American Petroleum Institute has been won by Clarence Froome, Union Oil Company division superintendent at Santa Paula. Froome received the honor for work on behalf of the oil industry as a whole.

Lee A. Brand of Belleville, Illinois, was reelected chairman of the national committee for LP-Gas Promotion for the third time at a meeting in Chicago. He has headed the group since February, 1950.

Tevis F. Morrow, whose field developments have been on the sensational side both in California and Texas, has reserved the Mocambo on the famed Los Angeles Sunset strip for a fabulous New Year's Eve party. Invited have been 400 guests from Southern California, Texas and New York and the tab is likely to add up to some $30,000. The Morrows are giving the party primarily in honor of Al H. Meadows, president of the General American Oil Company of Texas; Herbert W. Klein, prominent independent oilman, and their wives, who are coming from Dallas to be in attendance.

Frank D. Gardner, Sinclair Oil and Gas Company, is the new chief of the Office of Price Stabilization's crude oil section. Gardner is on leave as district representative for Sinclair in west Texas and New Mexico.

Edwin W. Pauley flew from Los Angeles to Mexico City to be in attendance at the inauguration of Adolfo Ruiz Cortines, Mexico's great new president.

International guests at the November meeting of the Los Angeles Chapter of Nomads—standing (left to right) Kenneth Smith of Trans-American Pipe Line Co. from Iraq; Mario Cueto of Reed Roller Bit Co. from Buenos Aires; Edmond M. Mong of Iraq Petroleum Co. from Iraq; Ralph H. Connor of Transworld Management Corp., formerly with Iraq Petroleum Co.; Vincent W. Vandiver, foreign exploratory geologist with Seaboard Oil Company. Seated, H. H. Mitchell of I. P. C. from Basrah; C. H. Vincent of B. M. P. (Shell); E. E. Higley of Ralph M. Parsons Co. back from China and going to South America; R. M. Long of Iraq Petroleum Co. from Iraq.

Who really owns Standard?

That old bogeyman—the Tycoon of Big Business—seems still to linger in the minds of some people. Whether or not this was ever a true picture, it is certainly false today. Standard Oil Company of California, for instance, is widely held, independent. It has its own management and shareholders. It is not connected with any of the Standard companies in the East.

The actual owners of Standard Oil Company of California now number 115,942—which is 17,000 more than just two years ago. They include 288 universities and other educational institutions; 236 churches and religious organizations; 1825 small and large businesses; 159 hospitals and other medical groups; 10,876 employees of the Company, and 102,563 other individual citizens, few of whom could be called rich. The great number of our shareholders are people like your own friends and neighbors—yourself, perhaps—mechanics, clerks, farmers, white-collar men, widows, men and women who have retired. ¶ In another sense, of course, the "owners" of Standard are our customers. You *control* the Company by your choice of brands, and you *benefit* by the quality and economy of the products we sell. The only way Standard can look after the interests of its shareholders is by making sure that Standard serves *you* well.

STANDARD OIL COMPANY OF CALIFORNIA ***plans ahead to serve you better***

San Joaquin Valley A.P.I.

Glenn V. Kersten was elected chairman of the San Joaquin Valley Chapter of the American Petroleum Institute at the annual election meeting on November 18 at the Petroleum Club in Taft.

Kersten is superintendent of Western Gulf Oil Company's South San Joaquin Valley area, with headquarters in the company's offices in the Fruitvale field.

Other new officers named at the meeting were Earl Armbruster of Shell Oil Company, first vice-chairman, and Hugh C. Mays of Crescent Petroleum Company, second vice-chairman. Bob Torrey of Southern California Gas Company will continue as secretary-treasurer of the valley chapter, which is the oldest active chapter in the American Petroleum Institute.

Members elected to replace those members of the ten-man advisory committee whose terms expire January 1, 1953, were R. S. Bruce, Western Pipe and Steel Company; Harry D. Campbell, Franco Western Oil Company; Wendell Eardley, Standard Oil Company of California; R. W. Walling, Division of Oil and Gas; T. E. Weaver, Tide Water Associated Oil Company; F. R. Schmieder, Shell Oil Company; H. M. Van Clief, Honolulu Oil Corporation; Clyde Perry, Richfield Oil Corporation; Tom McElheny, B J Service, Inc.; and G. H. Wells, Intex Oil Company.

Following election of officers, R. B. Teissler, production engineer for Western Gulf Oil Company in the Fruitvale field, presented a paper entitled "Completion and Production Methods Indicate Increased Economical Recovery."

A question-and-answer period ensued following this paper, featuring a panel of experts which included Teissler, Clyde Perry, Harry Campbell, John Fraser of Union Oil Company of California, and Al Horn of Standard Oil Company.

Glen Horrie of McCullough Tool Company screened two films dealing with the Battles of Okinawa and Midway Island. Both were official Navy films and were released through the courtesy of the United States Naval Air Reserve.

Bob McAdams, director of the R. M. Pyles Boys and Girls Camp, showed slides depicting work of the Pyles' camp, which is supported by members of the oil industry

More than 250 members of the San Joaquin Valley Chapter enjoyed a barbecued steak dinner at the Petroleum Club prior to the meeting. H. F. Donley of Axelson Manufacturing Company, was the master chef.

At a meeting of the board of directors of Canadian Atlantic Oil Company, Ltd., at Calgary, George L. McMahon was named chairman of the board and S. R. Smith was appointed to succeed him as president. Frank M. McMahon, chairman of the board of Pacific Petroleums, Ltd. and president of Westcoast Transmission Company and Peace River Natural Gas Company was also elected a director of the company.

Hoover Passes Away

Orville J. "Hooks" Hoover, Bakersfield drilling contractor, died November 23 in a Woodland hospital following a highway collision in which his son, Everett, suffered serious back injuries.

A native of Hartford, "Hooks" moved to the West Side in 1916, where he worked as a drilling superintendent for several major oil companies. He was a member of the crew on what is believed to have been the first rotary rig ever used in California.

Ten years ago he formed Hoover Drilling Company, with headquarters on Pierce Road in Bakersfield, and soon became one of the most active contractors in the San Joaquin Valley. He is credited with drilling the Richfield Oil Corporation's discovery well in Cuyama Valley several years ago along with many other important wells in California.

At the time of his death he was drilling a wildcat for E A. Bender in Yolo County.

Bessie I. Glenn of Shell Oil Company's exploration department in the Los Angeles area, recently presided as convention chairman for the 16th annual state gathering of the Delta Theta Chi national philanthropic sorority for business women. Theme of the convention was "Hollywood Premiere" and featured was California industry and transportation.

New officers of the San Joaquin Valley Chapter of the American Petroleum Institute are (left to right) Hugh C. Mays, Crescent Petroleum Company, second vice chairman; Earl Armbruster, Shell Oil Company, first vice chairman; and Glenn V. Kersten, Western Gulf Oil Company, chairman.

H. F. Donley, Axelson Manufacturing Company, accepts congratulations from Tom Woodward (right), consultant, for the outstanding job he did in preparing the barbecued steak dinner served at the November meeting of the San Joaquin Valley Chapter of the A. P. I. in the Petroleum Club at Taft. Woodward is adviser to the valley chapter.

Featured on the program at the November meeting of the San Joaquin Valley Chapter of the A. P. I. were (left to right) Glen Horrie, McCullough Tool Company; R. B. Teissler, Western Gulf Oil Company; and Bob McAdams, director of the R. M. Pyles Boys and Girls Camp.

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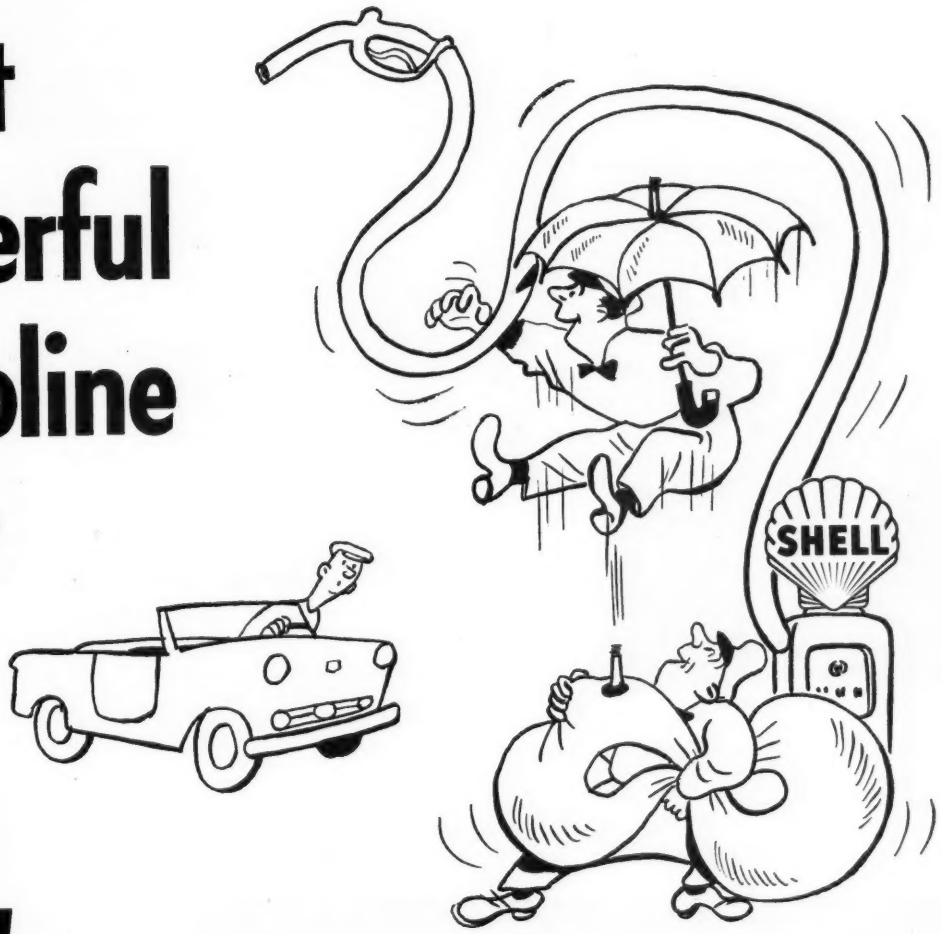

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SHELL PREMIUM GASOLINE

W. J. Williams Named Works Manager By Baash-Ross Tool Company

F. L. Tooley, Executive Vice President of Baash-Ross Tool Co. announces the appointment of W. J. "Bill" Williams as Works Manager, in which position he will be responsible for coordinating production and manufacturing operations throughout the 17 major plants and service shops maintained by Baash-Ross Tool Company in the nation's major oil areas.

W. J. Williams

Williams joined the Baash-Ross organization in 1926—over a quarter century ago. For more than 26 years he has specialized in the design, development and manufacturing of oilfield products, and he played a major role in developing the revolutionary new Baash-Ross Pressure Welding Machine now in extensive use for welding broken or worn drill collars, kellys and other heavy-walled oil field equipment.

Recently Williams has spent a major portion of his time in the West Texas area organizing production operations in the recently completed Baash-Ross Odessa plant. However, his normal field of operations will cover all of the Baash-Ross plants throughout the United States, with his headquarters located at the Los Angeles plant.

Alice Maronde Elected President of Long Beach Desk & Derrick Club

The Long Beach, California, Chapter of the Desk and Derrick Club has elected Alice Maronde, Lane-Wells Company, as its President for 1953. Alice will succeed Frances Rodenfels, Petrolite Corporation, who has successfully headed the Club since its organization in March, 1952. Frances is now Jr. Past President.

Alice is secretary to J. W. McPhee, Pacific Coast Division Manager of the Lane-Wells Company. She is a charter member of the Long Beach Club and has served as 2nd Vice-President and Field Trip Chairman.

Edna Sellers, F. E. Fairfield Company, and Ann Hoffman, Union Oil Company, were elected to the offices of 1st and 2nd Vice-Presidents, Kathy Kelly, Chiksan Co., is now Recording Secretary, and Jessie Johnson, Richfield Oil Corporation, is Treasurer. The Club's newly elected Directors are: Ruth Coolege, Long Beach Oil Development Company, Ruth Jenkins, D. D. Dunlap Oil Company, Iris Stoddard, Petrolite Corporation, and Zetta Belle Housely, Shell Oil Company.

Alice Maronde and J. W. McPhee look over 1953 plans of the Long Beach Desk & Derrick Club.

The Long Beach Desk and Derrick Club, now consisting of 141 members, has been an exceptionally active group and has stressed programs that will give the girls a sound knowledge of the Petroleum Industry. Well qualified speakers have presented the operations and purposes of many of the varied phases of the industry at the Club's regular meetings. A number of well-planned field trips has been taken to acquaint the girls with actual processes.

Signal Hill's oldest resident and friend of many oilmen, Philip Cruz, has passed away at the age of 87. Mr. Cruz, who was born in the pueblo of Los Angeles on June 21, 1865, had lived in the same house at 2084 Temple avenue in Signal Hill for the last 50 years. In his youth he worked as a sheepherder for the Dominguez family on the Dominguez and Palos Verdes Hills.

Back at his office in the Quinby Building in Los Angeles is genial Bob Davis after an inspection tour of his oil properties in Oklahoma. During his stay in Oklahoma two substantial producing wells were added to his holdings there.

These future petroleum engineers, now attending the Oil Well Drilling Class of Long Beach City College, recently inspected the plant of Web Wilson Oil Tools, Inc., in Compton. Sponsored by the American Association of Oil Well Drilling Contractors, and under the guidance of their instructor, A. R. Kerr, they watch the machining of a Web Wilson Drilling Hook.

New Powerful Weed Killer Cuts Fire Hazards

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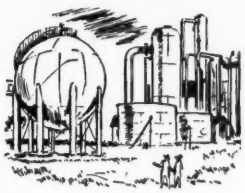

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Rocky Mountain NEWS

Colorado—Idaho—Montana—New Mexico—Utah—Wyoming—Western Canada

Wyoming

With considerable interest attached to the Phosphoria formation in the Five Mile area of Big Horn County, two recent tests have thus far failed to confirm earlier expectations.

Husky Oil and Wilshire were testing the Muddy at their second well in the area after repeated acidization of the Phosphoria had failed to produce substantial showings of gas and oil. The same operators had earlier completed their No. 1 Torgenson as a gas and oil producer for the area.

Sohio Petroleum Co. found 26 feet of saturation in the Embar-Phosphoria zone at its No. 1 Govt.-Coltrane but on drill stem test recovered only 30 feet of gas cut mud and 900 feet of sulphur water. Test was of the interval 11,902-940 feet. At latest reports the crew was waiting on orders.

Interest in the Phosphoria tests has been heightened by the possibility of construction of a sulphur plant at Manderson should sufficient production be indicated.

In Sublette County, Pfaff-Quealy's No. 3 Govt., a confirmation of an earlier gas discovery, has been shut in after flowing an estimated 8,000,000 cubic feet of gas daily on a 45-minute test through two 2-inch outlets in the casing. The well is located at 28-28n-113w in the Tip Top field. It was plugged back to 905 feet for completion after being drilled to 1208 feet.

The discovery well in this area was the No. 2 Govt. by the same operator, a well which blew wild for a week before being brought under control.

Stanolind Oil and Gas was continuing tests of its No. 1 Unit, sw ne ne 10-12n-103w, in the Middle Mountain area of Sweetwater County, which found oil in the Mesa Verde some time ago. Late reports showed the well flowing 169 barrels of oil and two barrels of water daily.

An important extension of the Sage Creek field in Park County, the No. 4 Dorothy Fox of Sunray Oil and Sohio Petroleum recovered 1237 feet of oil and 300 feet of oily water on drill stem test of the Tensleep. Production was from the interval 3317-37 feet. The well, 12-57n-98w, is a half mile from previous production in the field.

Gulf Oil Corp. was reported preparing to abandon the No. 1 C. H. Davis, a Powder River Basin test in Campbell County after drilling to 10,938 feet and finding water on drill stem test of the Madison. Shows of oil had been found in the Minnelusa at the interval 9775-9800 feet.

The well was one of three Powder River Basin failures recently by various operators. On the credit side was the Ranger Oil-Antone Petroleum No. 1 Fee at North Anthills on the east side of the basin. The test recovered 120 barrels of oil daily from the Dakota and 50 barrels daily from the Lakota. The Dakota was topped at 4814 feet and the Lakota at 4950 feet.

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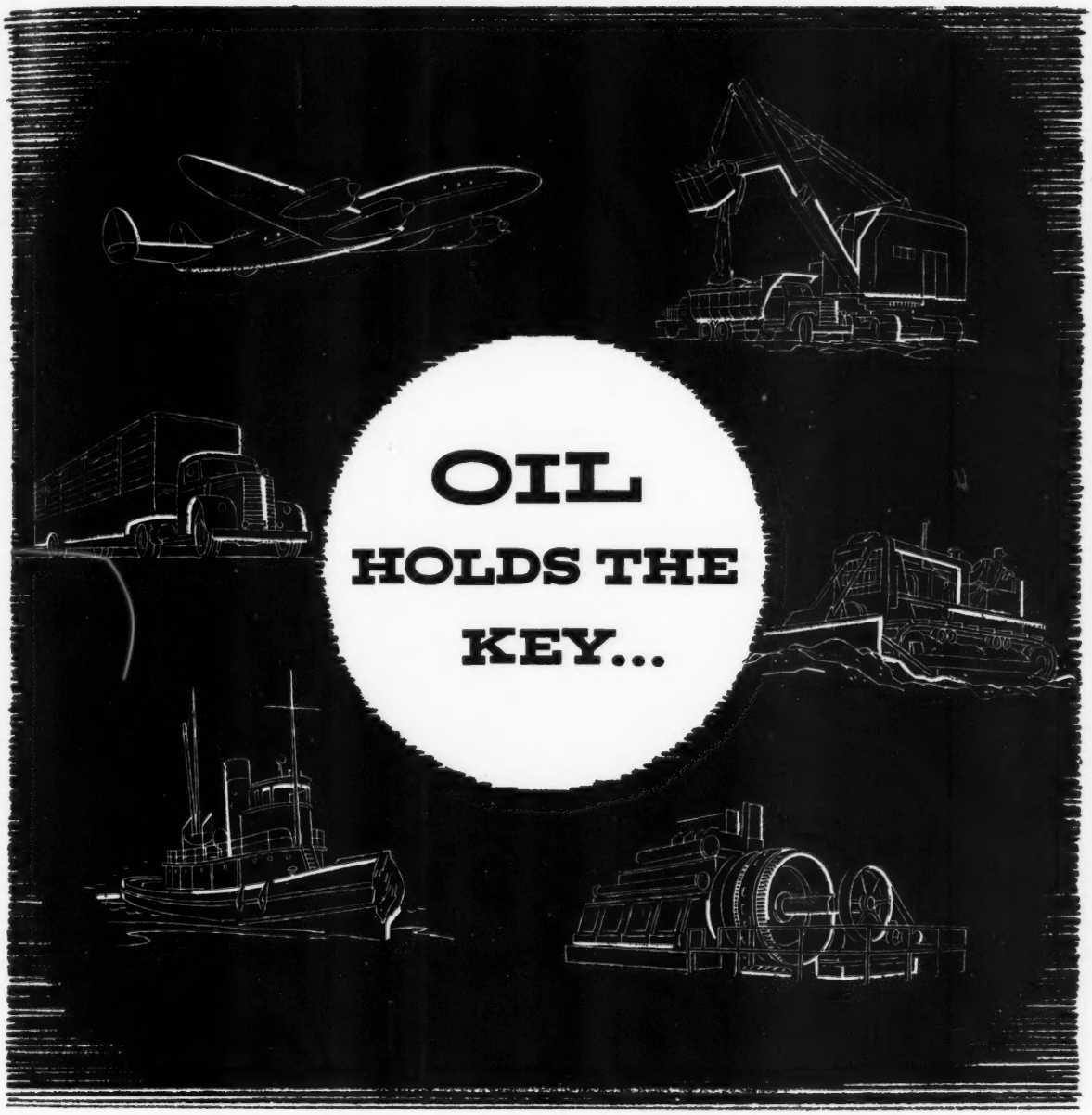
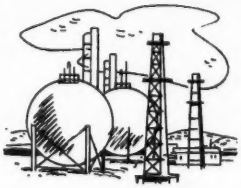
North Dakota

On the east side of the Williston Basin, Zach Brooks Drilling Co. of El Dorado, Ark., and Crawford E. Smith of Minot, N.D., were coring around 3550 feet at their No. 1 Edwin Berentson wildcat in Bottineau County. Operators recovered 330 feet of 38 gravity oil on straddle packer test from the Spearfish at 3245-55 feet. Cores taken later at 3347-97 feet and 3397-3438 feet recovered limestones and good showings of oil, apparently from the Madison. If the well becomes a commercial producer it will be the first one in this area east of the Nesson anticline. Location is se 21-163n-83w.

Stanolind Oil and Gas is reported to have taken over Deep Rock's No. 1 James Brusichs in Slope County and may deepen the well to 13,000 feet in the Madison. Deep Rock ceased operation at 10,006 feet in the Devonian.

Amerada Petroleum and Pacific Western were coring below 9350 feet after recovering oil and gas cut mud from their No. 1 Wollan, c nw nw 15-152n-96w in McKenzie County.





It's a pretty well-known fact that in times of peace or of international stress, oil holds the key to the well-being of our country.

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Drill stem test was taken at 9099-9177 feet after the Madison had been topped at 8892. Amerada suspended operations on another wildcat, the No. 1 Kermit Halverson, earlier this year after drilling to 9705 feet.

Montana

Cities Service Co. planned to test the Tensleep with its No. 1 Govt., 33-6s-21e, Carbon County. In a 24 hour test of the interval 8012-26 feet, the well swabbed 25 barrels of oil and 80 barrels of basic sediment and water in 24 hours. The Rierdon was topped at 7200 feet, the Amsden at 8079 and the Madison at 8259.

Gulf Oil Corp. was continuing to test its No. 1 State, 6-11n-32e, after the well flowed 235 barrels of oil in 20½ hours through open tubing. Operator was testing through perforations at 4758-76 feet. The well is in the Northwest Sumatra area of Rosebud County.

Continental Oil Co. found production in the Madison and was preparing to set casing in its No. 1 Fast, c ne se 14-30n-46e, Roosevelt County. Recovery was at the rate of 20 barrels per hour on drill stem test of the interval 6414-48 feet. The well is in the West Poplar area, which has seen considerable lease play because of Richey area and East Poplar successes.

Colorado

One Weld County wildcat made a good recovery on drill stem test, another was drilling ahead after finding good oil shows, and a third was on pump.

The Midwest Oil Co. No. 1 Uhl, 22-11n-56w, was preparing to run casing after recovering 265 feet of oil and 100 feet of oil cut mud from the J sand at the interval 6127-39 feet. The well is north of the Pawnee Creek area.

The No. 1 State of La Gloria Corp. was below 6690 feet and in the J sand, where good shows were reported. Operator planned to drill ahead before attempting further tests after several attempts resulted in packer failure. The well is located at 4-2n-61w.

South Texas Development installed pump at its No. 1 Derks after recovering 75 barrels of oil and 75 barrels of water on 24-hour swab test. Earlier on a four-hour swab test the well made 42 barrels of oil and 14 barrels of water. The well is at nw nw se 17-8n-56w and production was from the Dakota at the interval 5923-25 feet.

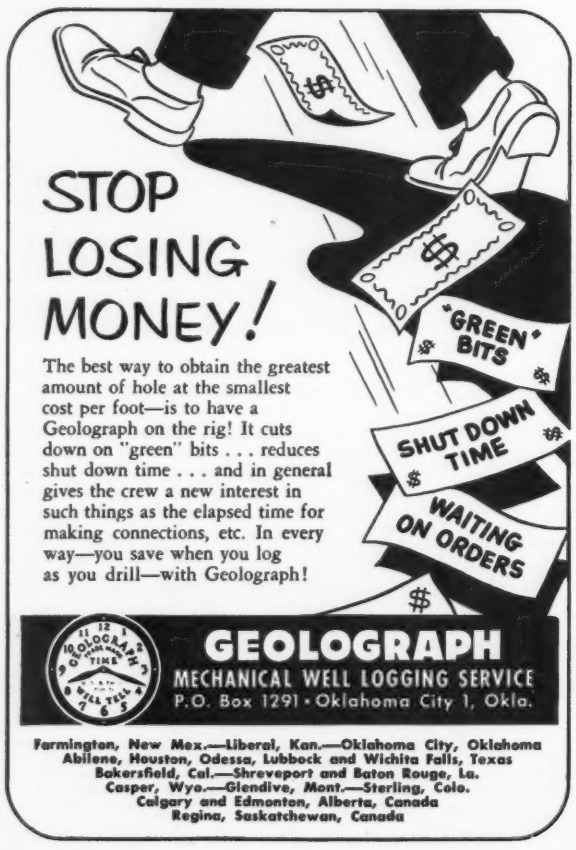
R. L. and J. L. Rush's No. 1 Jones, discovery well of the Rush-Willadel field in Washington County, was placed on pump after showing production of 162 barrels of 22.2 gravity oil on 24-hour gauge.

Utah

Utah Natural Gas Co. will start work in January to lay a pipeline from the Carbon County field to Salt Lake City. Three States Natural Gas is currently conducting a development program of the Ferron sand in this field to evaluate reserves for the new line. Mountain Fuel Supply Co. will be the distributor of the gas in Salt Lake City.

Stanolind Oil and Gas planned further testing of its Pleasant Valley wildcat, 23-8s-16e, in Duchesne County after recovering 15 feet of oil and gas cut mud from the interval 2951-3032 feet. The new test was scheduled below 3400 feet.

Pacific Western's No. 3 Unit in the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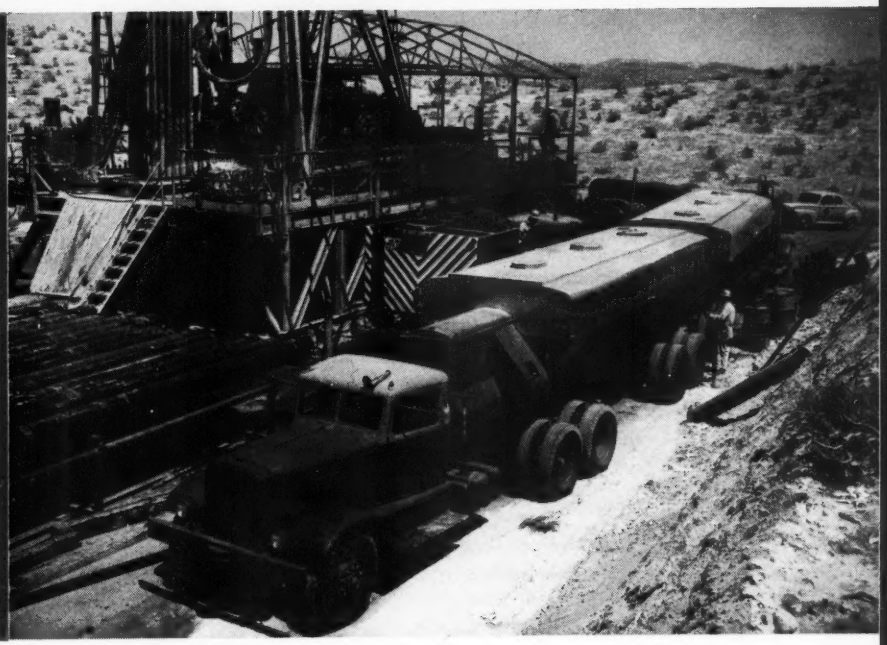

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Gordon Creek field, which flowed a million and a half cubic feet daily from the Ferron sand, has been shut in. Top of the Ferron was logged at 3418 feet, and the Dakota at 4233, but water was found in the latter formation.

Nebraska

Extension of the Southwest Sidney gas field was indicated with the recovery of 2,900,000 cubic feet of gas per day from Ohio Oil Co.'s No. 1 Chambers, 14-13n-51w. The recovery was on drill stem test of the D sand at 4872-89 feet. Operator was drilling ahead and planning further tests. The well is located at nw se se 14-13n-51w in Cheyenne County.

In Morrill County, Chicago Corp. and Republic Natural Gas installed pump at the No. 1 Schlumberger at 1-18n-50w in the Hart field. On drill stem test of the interval 4019-34 feet, operator recovered 1210 feet of oil. The same companies are drilling two other development wells in the area which were below the 4000 foot level.

Magnolia Petroleum found production in the J sand at the No. 1 Van Pelt, sw sw sw 24-18n-56w, in Banner County. The sand was topped at 6467 feet and test was at 6472-82, with a 24-hour pump gauge of 42 barrels of oil and eight barrels of water. The well is five miles south of the Harrisburg field.

New Mexico

Phillips Petroleum Co. is carrying on an extensive evaluation program of large holdings in the San Juan Basin and may drill up to 60 wells by next spring. Pacific Northwest Pipeline has entered into an agreement with Phillips to purchase 180,000 acres if Pacific Northwest is granted FPC approval for a pipeline to the Northwest. Phillips was drilling three wildcats in Rio Arriba County and had other locations staked. In San Juan County Phillips was drilling around 7300 feet at its No. 1 Navajo, 5-30n-17w, a Mississippian test. Gas production was expected.

Western Canada

Cities Service Oil Co. has announced an 8400-foot test of a 99,840 acre exploratory reservation in the Peace River area of Alberta. The test will be Lone Star No. 1, located center lsd 15, sec. 7-89n-1w6th.

Canada-Cities Service Petroleum Corp. will be the operator, with the Cretaceous sandstones announced as the main objective of the test. The reservation on which the test will be drilled is held jointly with British-American Oil Co.

Five miles north of the North Dakota boundary, the No. 1 Ratcliff drilled by Socony-Vacuum-Central Le-Duc Del Rio Producers has made good recovery of oil on test of the Mississippian. The well is located at lsd 5, 30-1n-15w, 2m and is particularly significant because of Williston Basin developments.

Ranchmen's Hamilton Lake No. 1, Viking sand discovery, was placed on pump for further tests after swabbing recovered 34.4 gravity oil at the rate of 12 barrels per hour. Production was from the zone 3015-25 feet. The well is located in lsd 8, 14-35-9w4. An offset well drilled to 3030 feet resulted in gas flow at 2,000,000 cubic feet per day, but no oil. A third well will be drilled half a mile northwest of the discovery.

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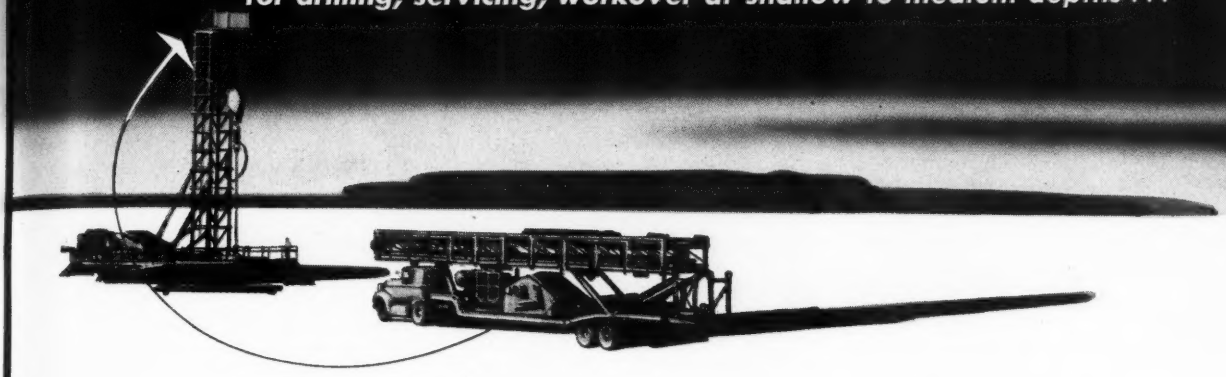

New additions to the family of National "Ideal" Rigs include four units which are particularly well-suited for shallow to medium depth drilling, as well as for servicing and workover.

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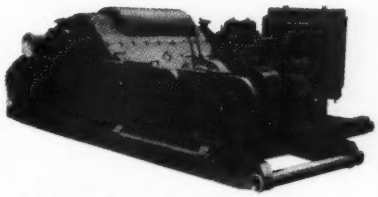
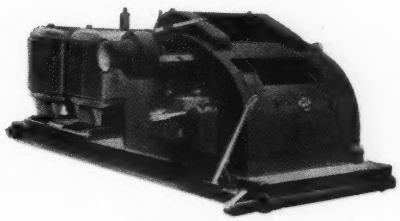


"Ideal" Type T-20 Rig



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THIS LAUGH

OFF!!

An Englishman was very proudly exhibiting to a Yankee friend the pictures of his ancestors. Pointing to one of them, he explained that he was the founder of the family. The American several times asked, "What did he do?"

And each time the Englishman had replied that Sir Archibald was the founder of the family. Finally, the Yankee's patience was about exhausted, and he shouted.

"Yes, you've told that over and over again, but what I'm trying to find out is, what did he do in the daytime?"

A Russian soldier arrived home, after an absence of three years in the army. He found his wife with a newborn baby, whereupon he began to question her.

"Was it my friend Ivan?" "No."

"Was it my friend Nicolas?" "No."

"Was it my friend Petrov?" "No."

"Well then, who was it?" he shouted. And his wife calmly answered, "Don't you think I have any friends of my own?"

A canny Scot was engaged in an argument with the conductor as to whether the fare was to be five or ten cents. Finally the disgusted conductor picked up the Scot's suitcase and tossed it off the train just as they were crossing a long bridge. It landed with a mighty splash.

"Hoot, Mon," screamed Sandy. "First you try to rob me and now you have drowned my boy!"

A new father was looking at the babies through the window of the infant ward, and it seemed that every baby there was crying.

"Why are they bawling?" he asked the nurse.

"Listen," she said severely, "if you were only a few days old, without any clothes, out of a job and owed the government almost $1,700 on the national debt, you'd be bawling, too!"

Employer to secretary: "I had a dream about you last night."

Secretary: "Did you?"

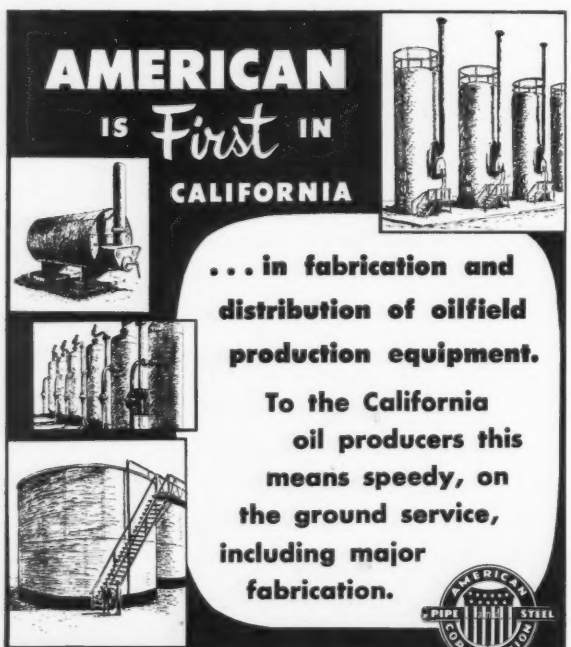
Employer: "No, you wouldn't let me!"

Tom met Harry after several years. "And is your wife as lovely as ever?" he asked him.

"Oh, yes," replied Harry, "but now it takes half an hour longer."

Ordeal—what an ideal becomes after you marry him.

Hell hath no fury like the eleventh best-dressed woman in the country.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